FAST

- 24 hours delivery service – order today, on its way tomorrow
- Sales & service hotline from 8:00 am to 6:00 pm

RELIABLE

- 2 years warranty

DIVERSE

- One-stop shopping: from force gauges through to hygrometer – everything from one supplier
- Quick as a flash, find the product you want with the „Measuring instruments Quick-Finder“ at www.kern-sohn.com

SAUTER Service guarantee:

„We at SAUTER are only satisfied when we've found the very best solution for you. After all, our heritage from the Swabian Jura Mountains and the famous inventive talent of the people that live here, means we have an exceptional reputation to maintain..“

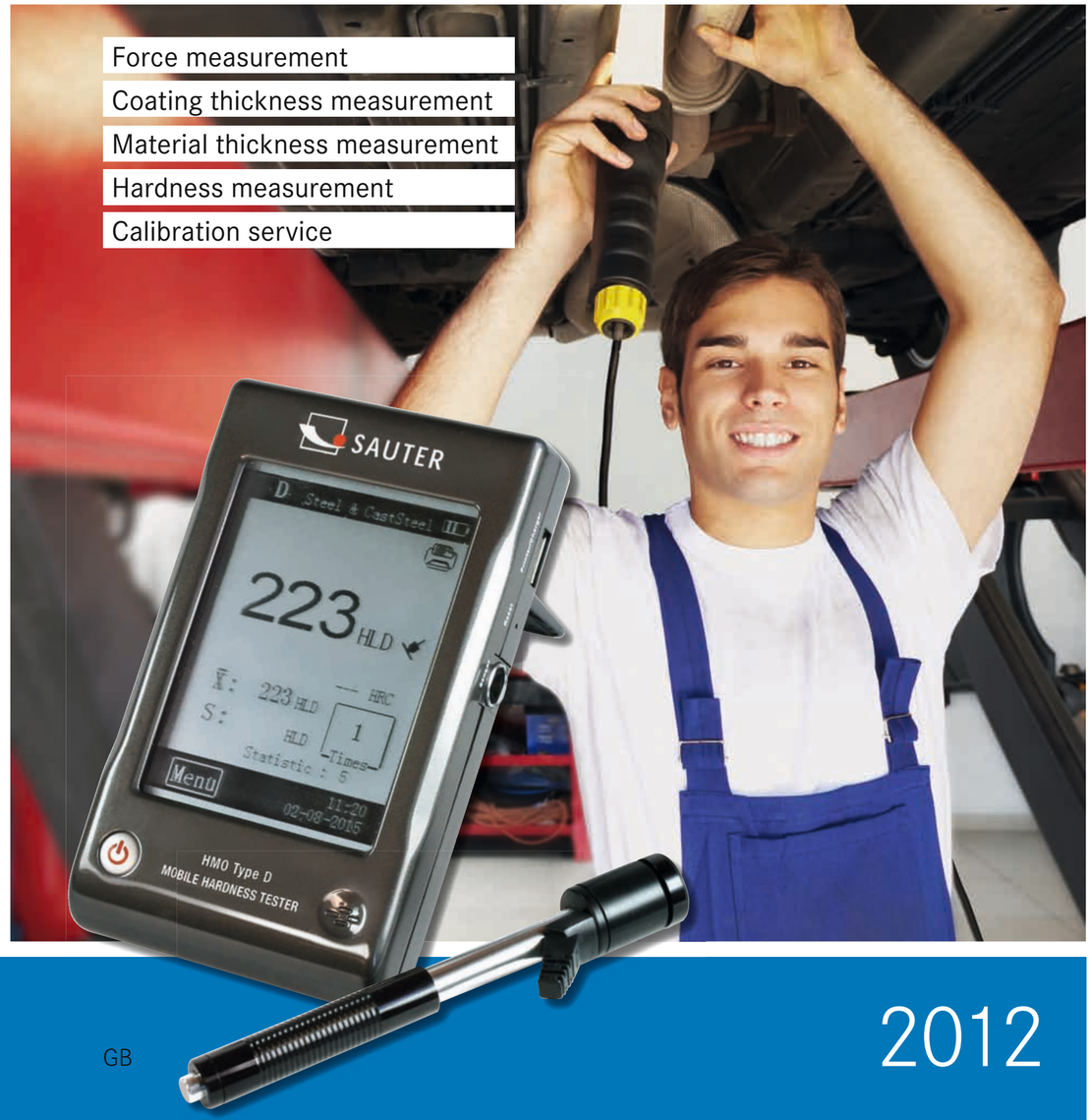
SAUTER

German Excellence Group

Printed in Germany
cs-gb-nn-201201

SAUTER

MEASURING TECHNOLOGY



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2012

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SAUTER Pictograms

External sensor: the sensor is separated from the display unit by cable.

Calibration block: standard for adjusting or correcting the measuring device.

Ultraviolet light: for optical analysis of the test object.

Electrical conductivity: for testing electrical material characteristics.

Thermal conductivity: for testing thermal material characteristics.

Scan mode: continuous capture and display of measurements.

Peak hold function: capturing a peak value within a measuring process.

Push and Pull: the measuring device can capture tension and compression forces.

Length measurement: captures the geometric dimensions of a test object or the movement during a test process.

Focus function: increases the measuring accuracy of a device within a defined measuring range.

Function to set limits: Input of an upper/ lower limit value. A visual and acoustic signal supports the measuring operation

Motorised drive: the mechanical movement is carried out by a motorised drive.

Fast move: the total length of travel can be covered by a single lever movement.

Internal memory: to save measurements in the device memory.

Statistics: using the saved values, the device calculates statistical data, such as average value, standard deviation, etc.

Printer: a printer can be connected to the device to print out the measurements.

PC software: to transfer the measurements from the device to a PC.

Switch / Analog Output

Data interface: RS 232 C, bidirectional, for connection of printer and PC.

Data interface USB

Battery operation: The battery type is specified for each device.

Rechargeable battery pack: rechargeable set.

Warranty: The warranty period is shown in the pictogram.

Package shipment via courier.

Pallet shipment via freight forwarder.

SAUTER – A heritage of precision

Dear customer,

for over seven generations my family has been leading the way in the precision measuring instruments' industry. Today more than ever before, there is a need for the most precise measurement.

We're also passionate about offering you products of highest possible quality, at the most affordable prices.

That's why we not only offer a comprehensive range of universal standard products, but also design bespoken solutions to fit your unique needs.

Take a look through our catalogue. If you have any queries or feedback, do not hesitate to call me or any of my colleagues. We'll be pleased to help you.

SAUTER - Professional measuring equipment tailored to the requirements in the field.

Yours Albert Sauter, Managing director

KERN & Sohn GmbH

For a wide variety of scales and weights please visit the website of our partner company KERN & Sohn or have a look through the product offering from page 53 onwards in this catalogue. Kern & Sohn is a leading provider in this industry.

SAUTER

German Excellence Group

++ NEWS +++ NEWS +++ NEWS +++ NEWS ++

NEWS BALANCES 2012

Precision balance EMB-V

Special balance for simple density determination

COMING SOON...

Precision balance PCD

High resolution precision balance with removable display for maximum flexibility

COMING SOON...

Precision balance PKS

Convenient model with easy operation thanks to the graphics display

Precision balance PKP

Robust laboratory and industrial scales with graphics display

Precision balance PKT

Touchscreen laboratory balance with extensive range of functions

Precision balance PLT

High-quality precision balance with convenient graphics display

Analytical balance ACS/ACJ

Entry level analytical balance with high-quality single cell weighing system

Moisture analyser DBS

Modern moisture analyser with 10 memories and graphic display

Moisture analyser DLB

Robust moisture analyser for samples up to 160 g

Stainless steel platform balance SFE

Platform balance with dust and spray protection IP65 and suitable for verification [M]

Price computing scale RFB

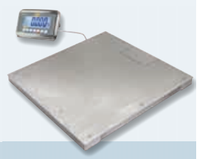
Compact entry level retail scales, protected to IP65 and EC-Type Approval [M]

Price computing scale RFS

High-quality retail scale with integrated receipt printer and EC-Type Approval [M]

Stainless steel floor scale BFN

Stainless steel floor scale with IP68 platform



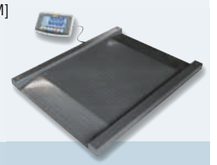
COMING SOON...

Weighing beams UFA

Weighing beams can be used for large loads in many applications

Drive-through scale NFB

Robust, industrial drive-through scale with two integrated access ramps, with EC-Type Approval [M]



Mobile pallet weigher VFS

Pallet truck scale with large display, integrated printer and rechargeable battery pack

All prices listed here are without legal VAT.

NEWS 2012 NEWS

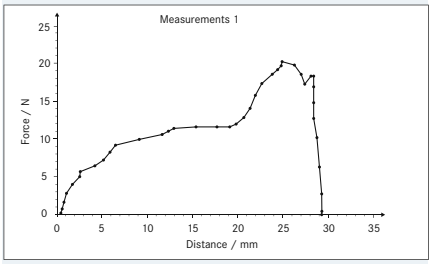
Tension testing instrument FK Tensio

Measuring device for the tensile strength of cables, threads, wires, etc.

➔ Further details see **page 57**

Software AFH FD

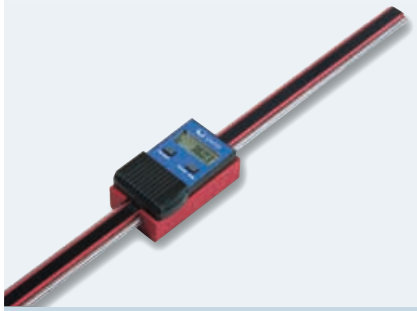
Force-displacement analysis software for testing materials.



➔ Further details see **page 20**

Length meter LB

Can be attached to test stands, machines, installations, etc.



➔ Further details see **page 27**

Mobile Leeb hardness tester HN-D

„Pen type“ hardness testing device in accordance with Leeb testing for mobile hardness testing of metals.

➔ Further details see **page 43**

Light measuring instrument SN

Light measuring instrument for precise light measurement up to 100,000 Lux for occupational safety.

➔ Further details see **page 53**

Light measuring instrument SO

Light measuring instrument for precise light measurement up to 200,000 Lux for occupational safety.

➔ Further details see **page 54**

Thermo-hygrometer SX

Temperature measurement for occupational safety.

➔ Further details see **page 55**

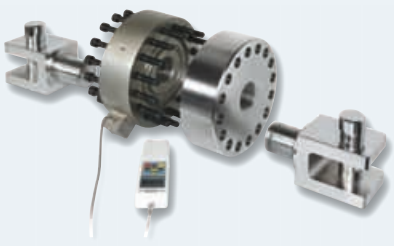
Sound level meter SU

Noise measurement for occupational safety.

➔ Further details see **page 56**

Force measurement FH-L

Force measurement systems for high-capacity testing up to 100 tons.



➔ Further details see **page 57**

All prices listed here are without legal VAT.

Your advantages:

Price performance ratio
SAUTER measuring instruments are always an inexpensive alternative. They are durable, uncomplicated and easy to put into operation.

Quick Delivery
Items in stock are sent the same day if orders are placed before 1:00 pm (valid for parcel service delivery within the EC).

Ordering:

Order hotline
Please see back side of the catalogue

Service hotline
Please see back side of the catalogue

DKD hotline
Please see back side of the catalogue

Our team of consultants will assist you

Fax Order
Please see back side of the catalogue

Online-Shop

ONLINE-SHOP
At your disposal round the clock. Here you can order all KERN products quickly and easily. Delivery and service through your specialist dealer.

MEASURING INSTRUMENTS QUICK-FINDER
Quick as a flash, find the product you want with the „Measuring instruments Quick-Finder“

CALIBRATION
In our accredited DKD (= German Calibration Service) calibration laboratory, we issue internationally valid DKD calibration certificates for balances and test weights.

ONE-STOP-SHOPPING
From force gauge trough to test stand - everything from one supplier.

DOWNLOADS
For each model there is an individual brochure, user manual or pictures.

SPECIAL OFFERS
Special offers, special models and opportunities – something for everybody and always up to date – just drop in!

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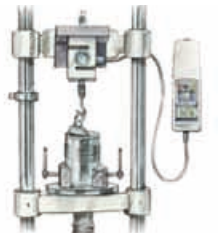
Force measurement		6-22	01
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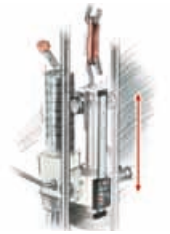
Length measurement		25-27	03
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1 Force measurement

SAUTER Model		Page
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FH-S	Universal digital force gauge (Push/Pull) with Peak-Hold function	9
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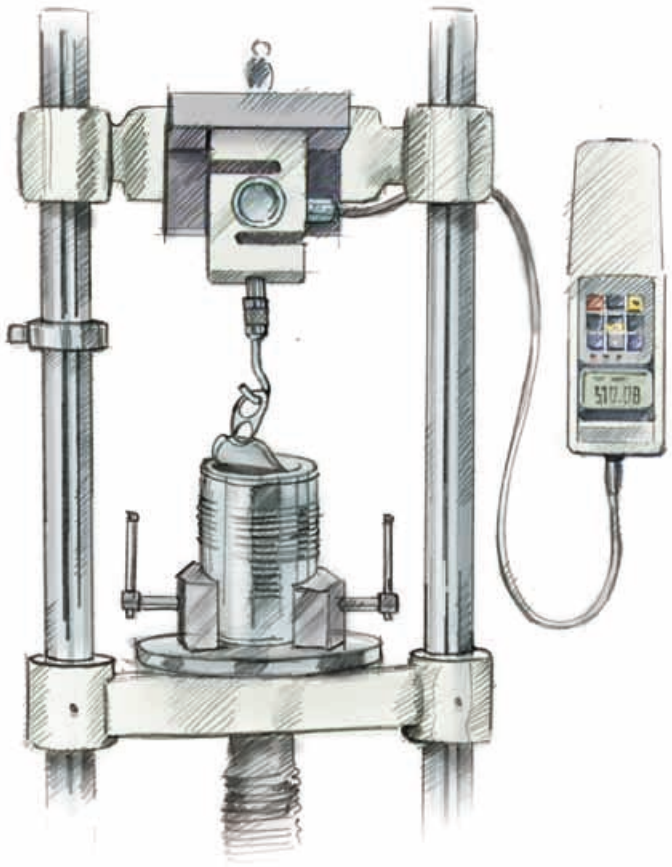


Modern material testing covers, amongst other things, the capture of extraction and impression forces. This is an integral part of the test process.

To do this, SAUTER offers an attractive range of reliable measuring equipment. Our measuring equipment does not replace any traditional material testing machines. With their simple and flexible construction, our test systems have been designed for testing on your production line.

SAUTER force-measuring devices and test stands stand out because they are easy to use, give high speed of operation and are tough enough to withstand harsh environmental conditions.

As a guide, the following has been put together as a sample system for typical material testing applications:

- Force-measuring device, e.g. FH or FK series
- Test bench, e.g. TVL or TVM-N series
- Calibration e.g. 961-163
- PC evaluation software e.g. AFH FAST (only in combination with the FH series)

Quick-Finder Force measurement

Readout [d] N	Measuring range [Max] Nm	**Model** **SAUTER**		Page
0,001	2	**FH 2**		9
0,001	5	**FH 5**		9
0,005	10	**FK 10**		8
0,005	10	**FH 10**		9
0,01	20	**FH 20**		9
0,01	25	**FK 25**		8
0,01	50	**FH 50**		9
0,02	50	**FK 50**		8
0,05	10	**FA 10**		7
0,05	100	**FK 100**		8
0,05	100	**FH 100**		9
0,1	20	**FA 20**		7
0,1	200	**FH 200**		9
0,1	250	**FK 250**		8
0,1	500	**FH 500**		9
0,2	30	**FA 30**		7
0,2	500	**FK 500**		8
0,25	50	**FA 50**		7
0,5	100	**FA 100**		7
0,5	1.000	**FK 1K**		8
0,5	1.000	**FH 1K**		10
1	200	**FA 200**		7
1	2.000	**FH 2K**		10
1	5.000	**FH 5K**		10
2	300	**FA 300**		7
2,5	500	**FA 500**		7
5	10.000	**FH 10K**		10
10	20.000	**FH 20K**		10
10	50.000	**FH 50K**		10
50	100.000	**FH 100K**		10
100	200.000	**FH 200K**		57
100	500.000	**FH 500K**		57
1000	1.000.000	**FH 1m**		57

Mechanical force gauge SAUTER FA

1

2

Mechanical force gauge for measuring push and pull forces with peak hold function

Features

- **Dual scale**: shows Newton and kg
- **Rotatable display unit** for an easy calibration of the instrument
- **Peak hold function** through drag pointer
- Can be mounted on all manual test stands
- Zeroing by a short push of the switch
- 1 Delivered in a hard carrying case
- 2 Standard attachments: as shown below, extension rod: 90 mm

Technical data

- Precision: 1 % of [Max]
- Dimensions WxDxH 60x50x230 mm
- Net weight approx. 0,56 kg

STANDARD: PEAK, PUSH/PULL

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model **SAUTER**	Measuring range [Max] N	Readout [d] N		Option **ISO Calibr. Certificate** ISO KERN	
FA 10	10	0,05		961-161	
FA 20	20	0,1		961-161	
FA 30	30	0,2		961-161	
FA 50	50	0,25		961-161	
FA 100	100	0,5		961-161	
FA 200	200	1		961-161	
FA 300	300	2		961-161	
FA 500	500	2,5		961-161	

Digital force gauge SAUTER FK

1

2

Robust Push/Pull force gauge for simple measurement

Features

- **Turnable display:** automatic direction identification
- **Secure operability** due to ergonomic design
- **Real time** or **Peak Hold Mode** to observe transcients or capture peaks
- Selectable measuring units: N, lb, kg, oz
- **Auto-Power-Off**
- 1 Standard attachments: as shown below, extension rod: 90 mm
- Can be mounted on all SAUTER test stands

Technical data

- Precision: 0,5 % of [Max]
- Measuring frequency: 1000 Hz
- Overload protection: 200 % of [Max]
- Dimensions WxDxH 84x35x195 mm
- Net weight approx. 0,6 kg

Options

- 2 Digital tension testing instrument. Measuring device for the tensile strength of cables, threads, wires, etc.: FK-T, see page 57

STANDARD: PEAK, PUSH/PULL, BATT, 230 V

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS, DKD +3 DAYS

Model SAUTER	Measuring range [Max] N	Readout [d] N		Option **ISO Calibr. Certificate** ISO KERN		Option **DKD Calibr. Certificate** DKD KERN	
FK 10	10	0,005		961-161		–	
FK 25	25	0,01		961-161		–	
FK 50	50	0,02		961-161		–	
FK 100	100	0,05		961-161		–	
FK 250	250	0,1		961-161		–	
FK 500	500	0,2		961-161		963-161	
FK 1K	1000	0,5		961-162		–	

Digital force gauge SAUTER FH-S

1

2

3

Universal digital force gauge (Push / Pull) with Peak-Hold function

Features

- **Turnable display** with backlight
- 1 Can be mounted on all manual test stands
- Digital force gauge with internal sensor
- **Data interface RS 232 C**, included
- 2 Standard attachments: as shown below, extension rod: 90 mm
- 3 Delivered in a hard carrying case
- Selectable measuring units: N, lb, kg
- **Real time** or **Peak Hold Mode** to observe transcients or capture peaks
- **Function to set limits:** Programmable high / low setpoints for go/no-go testing. Light and sound signal output
- **Auto-Power-Off**
- **Mini Statistics Kit:** calculates the average result from up to ten stored single results, min., max., n

Technical data

- High resolution: up to 10,000 points (total measuring range)
- Measuring frequency: 2000 Hz
- Precision: 0,5 % of [Max]
- Overload protection: 150 % of [Max]
- Dimensions LxWxH 238x63x36 mm
- Net weight approx. 0,64 kg

Options

- **Analogue output**. Control module with integrated relays. For example for machine control (I/O), SAUTER AFH-02
- **Force-time evaluation software**, data transmission rate: 20 Hz, SAUTER AFH FAST
- **Force-distance evaluation software** with graphic display of the measuring process, SAUTER AFH FD
- Further accessory see www.kern-sohn.com and page 21

STANDARD: PEAK, PUSH/PULL, ACCU, 230 V, RS 232, TOL, STATISTIC, MEMORY

OPTION: SOFTWARE, D/A ANALOG

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] N	Readout [d] N		Option **ISO Calibr. Certificate** ISO KERN	
FH 2	2	0,001		961-161	
FH 5	5	0,001		961-161	
FH 10	10	0,005		961-161	
FH 20	20	0,01		961-161	
FH 50	50	0,01		961-161	
FH 100	100	0,05		961-161	
FH 200	200	0,1		961-161	
FH 500	500	0,1		961-161	

Digital force gauge SAUTER FH-M

Force-measuring devices with external measuring cells

Features

- **Turnable display with backlight**
- Digital force gauge with remote sensor
- **Data interface RS 232 C**
- Selectable measuring units: N, lb, kg
- **Real time** or **Peak Hold Mode** to observe transcients or capture peaks
- **Function to set limits:** Programmable high / low setpoints for go/no-go testing. Light and sound signal output
- **Auto-Power-Off**
- **Mini Statistics Kit:** calculates the average result from up to ten stored single results, min., max., n

Technical data

- High resolution: up to 10,000 points (total measuring range)
- Measuring frequency: 2000 Hz
- Precision: 0,5 % of [Max]
- Overload protection: 150 % of [Max]
- Dimensions housing LxWxH 238x63x36 mm
- Dimensions sensor WxDxH
- FH 1K - FH 20K: 51x76,2x19 mm
- FH 50K: 76,3x108x25,5 mm
- FH 100K: 125,2x178x51,3 mm

Options

- **Analogue output.** Control module with integrated relays. For example for machine control (I/O), SAUTER AFH-02,
- **Force-time evaluation software,** data transmission rate: 20 Hz, SAUTER AFH FAST,
- **Force-distance evaluation software** with graphic display of the measuring process, SAUTER AFH FD,
- Further accessory see www.kern-sohn.com and page 21

STANDARD: PEAK, PUSH/PULL, ACCU, 230 V, RS 232, TOL, STATISTIC, MEMORY

OPTION: SOFTWARE, D/A ANALOG

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS, DKD +3 DAYS

Model SAUTER	Measuring range [Max] kN	Readout [d] N		Option ISO Calibr. Certificate ISO KERN	
FH 1K	1	0,5		961-162	
FH 2K	2	1		961-162	
FH 5K	5	1		961-163	
FH 10K	10	5		961-163	
FH 20K	20	10		961-164	
FH 50K	50	10		961-165	
FH 100K	100	50		961-166	

Manual test stands SAUTER TVE · TVL

SAUTER TVE

SAUTER TVL

Manual test stand for precise testing, also with digital length meter

Features

- For vertical and horizontal use
- Precise measurement results
- **High level of security** with repeated measurements
- **Large and removable base plate** with various holes for fixture mountings
- Can be used for force gauges up to 500 N

TVL:

- 1 **Digital length meter**
  - measuring range: 0,01 mm
  - Zero setting possible
  - Pre-length can be set manually

Technical data

- Max travel from base plate: 297 mm
- Travel distance per knob rotation (stroke): 3,1 mm

TVE:

- Overall dimensions WxDxH 150x235x495 mm
- Net weight approx. 8,6 kg
- Height of upper hook above base plate: 460 mm

TVL:

- Overall dimensions WxDxH 151x234x465 mm
- Net weight approx. 8,3 kg

STANDARD SCALE 1

STANDARD 1 DAY 2 YEARS GUARANTY

Model SAUTER	Measuring range [Max] N	
TVE	500	
with digital length meter		
TVL	500	

SAUTER TVP

SAUTER TVP-L

Manual test stand, also with digital length meter

Features

- Provides quick and consistent testing
- **High level of security** with repeated measurements
- **Provides maximum versatility** and precise measuring results
- **Lever operated test stand** for long distance measurement
- **Large and removable base plate** with various holes for fixture mountings

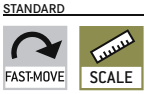
TVP-L:

- **Digital length meter**
  - measuring range: 0,01 mm
  - Zero setting possible
  - Pre-length can be set manually

Technical data

- Maximum carriage height above base plate: 318 mm
- Max travel with one stroke: 78 mm
- Overall dimensions WxDxH 150x233x420 mm
- Net weight approx. 10,5 kg

STANDARD



1

STANDARD

Model SAUTER	Measuring range [Max] N	
TVP	500	
with digital length meter		
TVP-L	500	

Motorised horizontal test stand SAUTER THM

1

Premium motorised test stand for force measuring with highest demands

Features

- **Easy to use**
- Efficient working
- Robust design and heavy duty metal construction
- **Various possibilities for fixture mountings** (see accessory page 21/22)
- 1 THM Foil Special for peel-off tests up to size DIN A4

Technical data

- Maximum tensile and compressive force: 500 N (Standard)
- Closest starting point of the carriage from the instrument: 30 mm
- Maximum length of travel: 250 mm (protected by electronic end switches)
- Overall dimensions LxWxH 550x170x345 mm
- Net weight approx. 35 kg

Options

- **Digital length measuring unit**, measuring range 300 mm, readout 0,01 mm, SAUTER ALA 300-2
- **Digital length measuring unit**, measuring range 300 mm, readout 0,01 mm, details see page 27, SAUTER LB 300-2

STANDARD MOTOR | OPTION SCALE | STANDARD 7 DAYS | 2 YEARS GUARANTY

Model **SAUTER**	Measuring range [Max] N	Speed range mm/min	
THM 100N1000	100	30 - 1000	
THM 500N500	500	15 - 500	
THM 1000N250	1000	10 - 250	

Motorised vertical test stand SAUTER TVO

01

1

Features:

- Motorised test stand for tension an compression tests
- **Table-top design** for comfortable operation
- **Robust design** for durable use
- Easy-to-access safety switch-off
- Upper and lower end point, can be set individually
- Automatic or manual operation mode
- 1 Can be used for force gauges up to 500 N (e.g. SAUTER FH, details see page 9)

Technical data:

- Maximum tensile and compressive force: 500 N
- Maximum length of travel: 300 mm
- Speed accuracy: 2 % of [Max]
- Overall dimensions LxWxH 570x428x236 mm
- Net weight approx. 25 kg

Options:

- **Digital length measuring unit**, readout 0,01 mm, SAUTER ALA, on request
- **Digital length measuring unit**, measuring range 300 mm, readout 0,01 mm, details see page 27, SAUTER LB 300-2

Premium test stand for laboratory applications

STANDARD MOTOR | OPTION SCALE | STANDARD 7 DAYS | 2 YEARS GUARANTY

Model **SAUTER**	Measuring range [Max] N	Speed range mm/min	
TVO 500N300	500	15 - 300	

Motorised vertical test stand SAUTER TVM-N

Premium motorised test stand for professional force measurements

Features:

- 1 Premium operation panel:
  - Digital speed display
  - Digital repeat function display
- **Force controlled automatic switchoff** (Teststop after achieving an adjusted limit load)
- **Repeat function** for durability tests (multiple up and down, adjustable)
- **Digital speed display**: shows the displacement speed
- **Various possibilities for fixture mountings** (see accessory)
- 2 Possibilitities to attach force gauges (only for SAUTER FH):
  - Force gauges with internal sensor (up to 500 N capacity), only for SAUTER TVM 5000N230N, SAUTER TVM 10KN120N
  - Force gauges with external sensor (starting at 1,000 N capacity)
- Large illustration with length measuring unit, force gauge and mount for test objects (not included)

Technical data:

- Maximum length of travel: 214 mm (protected by electronic end switches)
- Speed accuracy: 3 % of [Max]
- Initial height of the base plate: 171 mm
- Maximum travel of the base plate: 385 mm
- Minimum distance between base plate and bottom of upper object mounting: 85 mm
- Overall dimensions LxWxH 400x256x1015 mm
- Net weight approx. 58 kg

Options:

- **Digital length measuring unit**, measuring range 300 mm, readout 0,01 mm, SAUTER ALA 300-2
- 3 **Digital length measuring unit**, measuring range 300 mm, readout 0,01 mm, details see page 27, SAUTER LB 300-2

STANDARD MOTOR · OPTION SCALE · STANDARD 7 DAYS · 2 YEARS GUARANTY

Model SAUTER	Measuring range [Max] N	Speed range mm/min	
TVM 5000N230N	5000	10 - 230	
TVM 10KN120N	10000	30 - 120	
TVM 20KN120N	20000	30 - 120	
TVM 30KN70N	30000	5 - 70	

Spring tester SAUTER SD-S

Features:

- Spring tester for tension and compression tests
- **Integrated thermal printer**
- **Data interface RS 232 C**
- **Digital length measuring unit**:
  - Manual zero adjustment possible
  - Pre-length can be set manually
  - Readout: 0,01 mm
- **10 memories** to print out the results or to calculate average values
- **Function to set limits**: Input of an upper/lower limit value. A visual, acoustic and electrical switch signal (approx. 3 V) supports the measuring operation
- **Peak load display** (peak hold)
- Selectable measuring units: kg, lbf, N

Technical data:

- Precision: 0,5 % of [Max]
- Stroke length: 70 mm
- Maximum test object length: 70 mm
- Overall dimensions WxDxH 300x235x620 mm
- Net weight approx. 13,2 mm

Manual test stand for tensile and compressive testing of springs, small version from 10 up to 30 N

STANDARD: PEAK, PUSH/PULL, SCALE, TOL, STATISTIC, PRINT, FAST-MOVE

STANDARD: 7 DAYS, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] N	Readout [d] N		Option ISO Calibr. Certificate ISO KERN	
SD 10N70	10	0,001		961-161	
SD 20N70	20	0,002		961-161	
SD 30N70	30	0,01		961-161	

Spring tester SAUTER SD-M

Features:

- Spring tester for tension and compression tests
- **Integrated thermal printer**
- **Data interface RS 232 C**
- **Digital length measuring unit**:
  - Manual zero adjustment possible
  - Pre-length can be set manually
  - Readout: 0,01 mm
- **10 memories** to print out the results or to calculate average values
- **Function to set limits**: Input of an upper/lower limit value. A visual, acoustic and electrical switch signal (approx. 3 V) supports the measuring operation
- **Peak load display** (peak hold)
- Selectable measuring units: kg, lbf, N

Technical data:

- Precision: 0,5 % of [Max]
- Stroke length: 100 mm
- Maximum test object length: 100 mm
- Overall dimensions WxDxH 300x235x620 mm
- Net weight
  SD 50N100 approx. 17,3 kg
  SD 100N100, SD 200N100, SD 300N100 approx. 19,1 kg
  SD 500N100 approx. 20,8 kg

Manual test stand for tensile and compressive testing of springs, medium version from 50 up to 500 N

STANDARD: PEAK, PUSH/PULL, SCALE, TOL, STATISTIC, PRINT, FAST-MOVE

STANDARD: 7 DAYS, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] N	Readout [d] N		Option ISO Calibr. Certificate ISO KERN	
SD 50N100	50	0,01		961-161	
SD 100N100	100	0,02		961-161	
SD 200N100	200	0,05		961-161	
SD 300N100	300	0,1		961-161	
SD 500N100	500	0,1		961-161	

Spring tester SAUTER SD-L

Features:

- Spring tester for tension and compression tests
- 1 **Integrated thermal printer**
- **Data interface RS 232 C**
- **Digital length measuring unit**:
  - Manual zero adjustment possible
  - Pre-length can be set manually
  - Readout: 0,01 mm
- **10 memories** to print out the results or to calculate average values
- **Function to set limits**: Input of an upper/lower limit value. A visual, acoustic and electrical switch signal (approx. 3 V) supports the measuring operation
- **Peak load display** (peak hold)
- Selectable measuring units: kg, lbf, N

Technical data:

- Precision: 0,5 % of [Max]
- Stroke length: 150 mm
- Maximum test object length: 200 mm
- Overall dimensions WxDxH 490x300x920 mm
- Net weight approx. 47,5 mm

Manual test stand for tensile and compressive testing of springs, large version from 1000 up to 5000 N

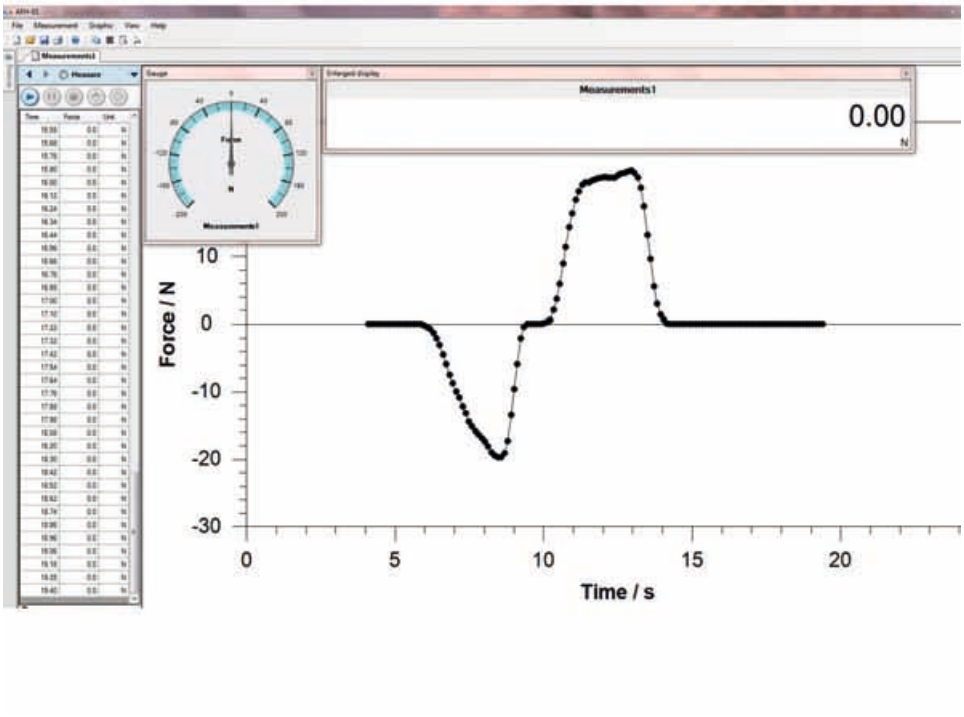
STANDARD: PEAK, PUSH/PULL, SCALE, TOL, STATISTIC, PRINT, FAST-MOVE

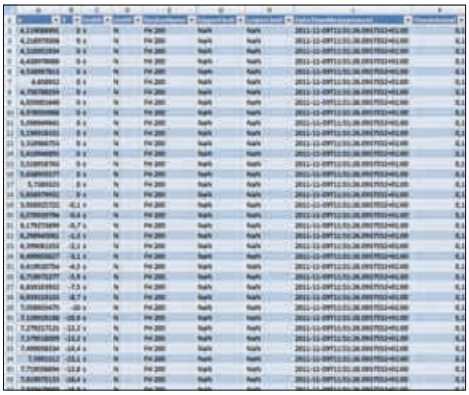
STANDARD: 7 DAYS, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] kN	Readout [d] N		Option ISO Calibr. Certificate ISO KERN	
SD 1KN150	1	0,2		962-162	
SD 2KN150	2	0,5		962-162	
SD 3KN150	3	1		962-163	
SD 5KN150	5	1		962-163	

Data transfer software SAUTER AFH FAST





High speed data transfer software for force-time-measurements

Features

- Force measurements can be conducted over a very short period, i.e. seconds
- A high speed data transfer to a PC is possible (with a transfer of up to 20 data sets per second) when combining the AFH FAST with SAUTER FH or SAUTER FT (only 3 data sets per sec.)
- AFH FAST shows the results in a Force-Time-Graph and can export the data to MS Excel.

Technical data

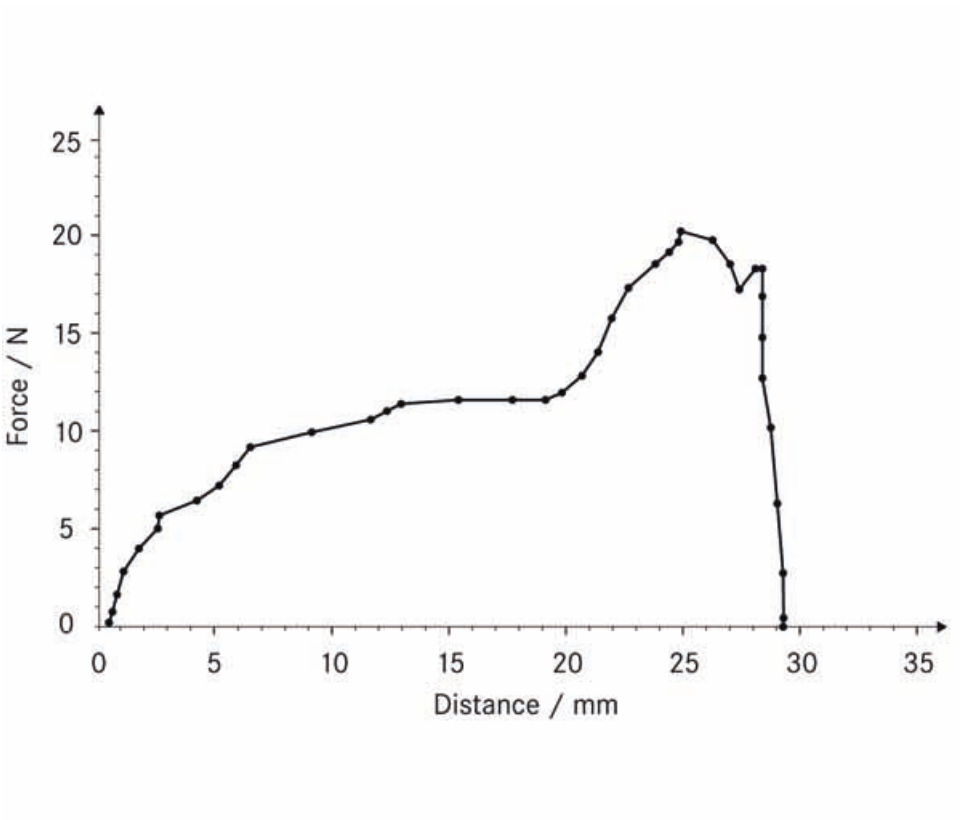
- Data recording rate max.: 20 Hz (with FH), 3 Hz (with FT)

Options

- 1 **Converter cable (RS 232 C to USB)**, SAUTER AFH 12

Model **KERN**	
AFH FAST	

Alanysis software SAUTER AFH FD



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Force-displacement analysis software for testing materials

Features

- AFH FD software is designed for all applications that require the measurement of forces, depending on the displacement. Typically these are force progression graphs in penetration tests or pullout tests
- The program simultaneously requests the measurements from a force-measuring device, e.g. SAUTER FH, as well as a length-measuring device, e.g. 1 SAUTER LB
- The measurements from both instruments are transferred continuously to the PC, synchronised by the AFH FD software and exported in the form of a graphic, as well as free data format for simple processing in Microsoft Excel
- The software AFH FD is compatible with all devices in the SAUTER FH and SAUTER LB ranges
- Other devices are not supported at this time, but may be included on request
- These measuring instruments are usually used with SAUTER test benches, in particular those from the SAUTER TVM-N range. However, it is also possible to use them with other mechanical testing machines
- Further analysis functions:
  - Dimensions of the test object
  - Tensile and compressive force
  - Load test
- - Archiving the recorded data
- 2 Scope of supply SAUTER AFH FD:
  - AFH FD software on DVD
  - User manual
  - Software licence
  - PC connection cable LB-A01 (RS 232 C to LB)
  - PC connection cable FH-A01 (RS 232 C to FH)
- 3 Order example for a complete test system:
  - FH 5K (Digital force gauge)
  - LB 300-2 (Digital length measuring unit)
  - AFH FD (Force-deflection software)
  - TVM 5000N230N* (Test stand)
  - LB-A02* (Mounting LB on test bench)
  - AFH 14* (Y-USB converter)
  - AC 04* (Test object holder)
  - 961-163* (Force calibration)
  - 961-150* (Length calibration)

  * not necessarily required for operating the AFH FD software

Technical data

- Data recording rate max. 3 Hz (specially in combination with SAUTER FH and SAUTER LB)
- Cable length of PC connection cable (RS 232 C) approx. 1,5 m

Options

- 4 **Y converter cable**, 2 x RS 232 C on USB, to connect both measuring devices to a PC or laptop via the USB interface, SAUTER AFH 14
- **PC connection cable** (RS 232 C) as standard, can be reordered,
  for SAUTER FH: SAUTER FH-A01
  for SAUTER LB: SAUTER LB-A01

STANDARD

GLP PROTOCOL

Model **SAUTER**	
AFH FD	

Stainless steel handle bar
with rubber grip for FH external sensor,
1 piece
FA, FH, **AFH 04**
FK, **AFK 02**

Pin vice
Tension, fracture, insert/withdraw
force Measurement, up to 500 N,
2 pieces
AC 01

Thin film grip
Tension, fracture, insert/withdraw
up to 5 kN,
2 pieces
AC 03

Pressure disc
Compression & fracture measurement
up to 5 kN, Ø 110 mm,
2 pieces
AFH 06

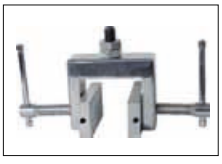
Grip clamp
tension measurement up to 5 kN,
2 pieces
AC 09

Cable fixture
Tension and fracture, all kinds of cables
up to 500 N, like SAUTER AC 10, small version,
1 piece
AC 10S

Parallel jaw grip
push or pull tests up to 5 kN,
2 pieces
AC 12

Fine point clamp
push and pull tests up to 500 N,
width: 15 mm,
2 pieces
AC 14

Heavy-duty-clamp
push and pull tests up to 5 kN,
2 pieces
AC 16



2-jaw-grip
tension and fracture tests up to 5 kN,
2 pieces
AC 18

Heavy-duty-grip for pulltests,
1 piece
AC 31 (up to 5 kN)
AC 32 (up to 10 kN)

Stainless steel handle bar
with rubber grip for safe handling,
1 piece
AFH 05

Ball shaped head
Tests tensile & pressure strength,
up to 5 kN,
3 pieces
AC 02

Wedge grip for tensile tests
for heavy duty use up to 5 kN,
1 piece
AC 04 (up to 5 kN)
AC 37 (up to 10 kN)

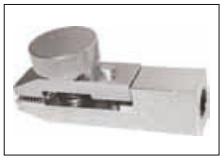
Pressure disc
for tensile tests up to 5 kN,
(e. g. plastics), Ø 49 mm,
2 pieces
AC 08

Cable fixture
Tension & fracture, all kinds of cables
up to 5 kN,
2 pieces
AC 10

Cable fixture
Tension and fracture, all kinds of cables
up to 5 kN,
2 pieces
AC 11

1-jaw-clamp
Tension, peeling force measurement
up to 5 kN,
2 pieces
AC 13

Ring fixture
Tension and fracture measurement
up to 500 N,
1 piece
AC 15



Long clamp
light clamp specialised in low-load tests
up to 50 N,
2 pieces
AC 17

Cylinder Top
tests tensile strength of springs
up to 500 N,
2 pieces
AC 19

Cylindrical clamps for extraction test
in particular from textile base layers,
up to 500 N,
1 piece
AC 36

Eccentric roll clamps
in particular for cable tests up to 5 kN,
max. opening: 9 mm,
1 piece
AC 41

Standard attachments kit
for all force-measuring devices FA and FH 10 up to 500 N, 6 items
AC 43

Flat square-shaped sensor
for lateral power sensing of back,
chest or arm up to 1000 N,
1 piece
AFH 46

Tombstone tester
Suitable for testing the stability of tombstones according to VSG 4.7,
1 piece
FA 500 G
Option: ISO Calibration
961-161

Box sensors made of aluminium,
in particular for rectangular packaging.
Fits on all TVM test stands, up to 5 kN
2 pieces
AC 50

RS 232C PC connection cable
from FH devices to PC as spare part,
1 piece
FH-A01

RS 232 USB converter, fits on all balances and instruments with RS 232 output,
1 piece
AFH 12

Bending attachment for bend testing
for material tests to increase the bend characteristics. Equipped with mirror to observe the lower side of the material, with three rounded, bending dies Ø 8,
12, 16 mm, mounted to swing freely. Rollers with ball bearings
1 piece
AC 51

Quick clamps
for high-capacity tensile tests up to 30 kN,
max. opening: 8 mm,
1 piece
AC 38

Drum clamps
typically for cable connector extraction tests up to 5 kN, for test objects with Ø from 1.5 mm to 8 mm, 1 piece
AC 42

Concave force sensor
with optimised radius for measurement, particularly of arms and legs up to 1000 N,
1 piece
AC 45

Round sensor
to measure particular muscle groups, such as, for example, the shoulder up to 1000 N,
1 piece
AC 08

Handle
(length: 300 mm) and two round force receptor plates (Ø 85 mm) as an option to FH 1K up to FH 5K for the safe testing of clamping forces (not approved to DIN 18650 or similar) , up to 5 kN, 1 piece
AFH 03

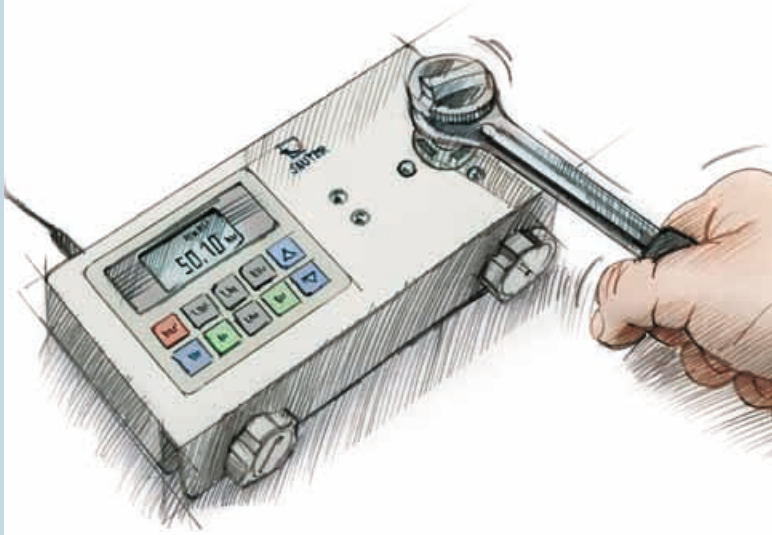
Carrying strap
Carrying strap for tombstone testers,
1 piece
AC 35

Tensiometer attachment
as spare part on all FK models from FK 10 up to FK 250, 1 pièce
1 piece
FK-A01

2 x RS 232 Y-USB converter
Fits on all balances and instruments with RS 232 output,
1 piece
AFH 14

2 Torque

SAUTER Model		Page
TB 10	Torque gauge for twist tests of bottles	24



There is a fundamental differentiation here between the measurement of static and dynamic rotary forces.

Dynamic rotary force measurement is typically carried out using torque sensors on test objects which are rotated - when the item is moving.

Static rotary force measurement, on the other hand, is always carried out when the item is not in use.

The SAUTER range has just one static rotary force measuring device for determining the force of rotary or screw caps on bottles.

Further typical applications of static torque measuring devices are the testing of assembly tools for screws and nuts, in particular torque keys and mechanical assembly tools such as for example battery screw drivers.

Quick-Finder Torque

Readout [d] N	Measuring range [Max] Nm	**Model** **SAUTER**		Page
0,01	10	**TB 10**		24

Digital torque gauge SAUTER TB-10

1

Torque gauge for twist tests of bottles

Features

- **Easy to use**
- **Solid construction:** Overload protection for sturdy application of containers
- 1 Container fixture:
  - Quick-catch, without tools
  - Possible container diameter: 16 - 140 mm
  - Turnbuckle
- **Mini Statistics Kit:** calculates the average result from up to ten stored single results, min., max., n
- **PEAK function** to fix the current measured values
- Selectable measuring units: Nm, LBinch
- **Data interface RS 232 C** included
- Integrated printer
- Delivered in a hard carrying case

Technical data

- Precision: < 1 % of [Max]
- Overload protection: 150 % of [Max]
- Dimensions device LxWxH 450x215x155 mm
- Net weight approx. 10 kg

Options

- **Software,** SAUTER AFH FAST

STANDARD: PEAK, TOL, ACCU, RS 232, STATISTIC, PRINT

OPTION: SOFTWARE

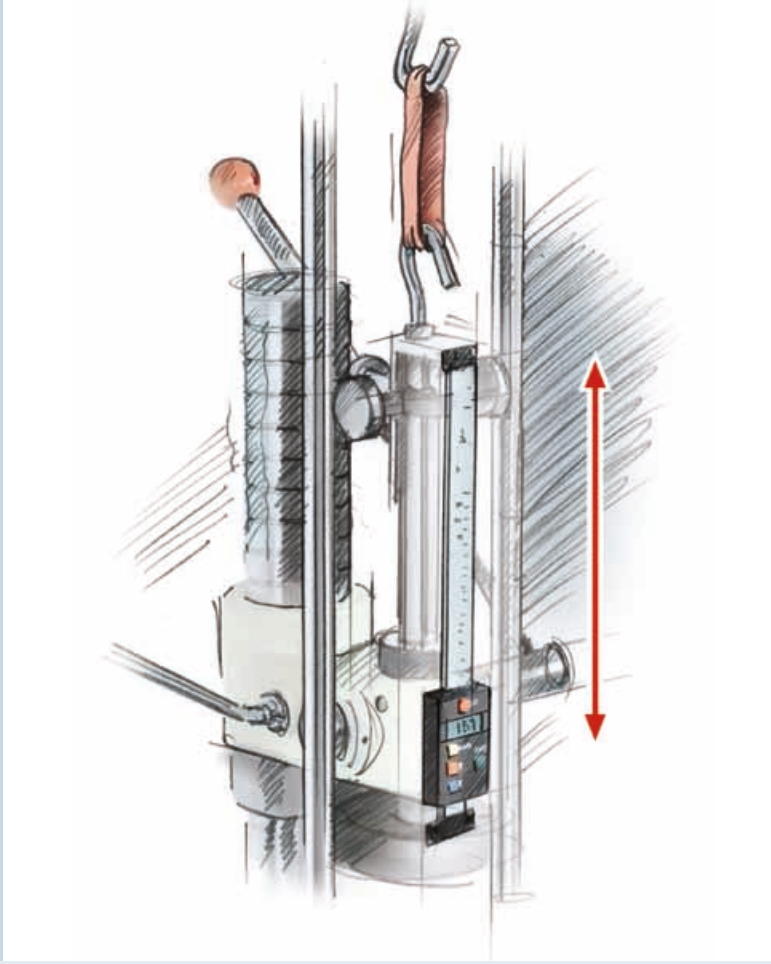
STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model **SAUTER**	Measuring range [Max] Nm	Readout [d] Nm		Option **ISO Calibr. Certificate** **ISO** KERN	
TB 10	10	0,005		page 58	

3 Length measurement

SAUTER Model		Page
LA	Distance measurement directly in your machines and installations	26
LB	Distance measurement directly in your machines or installations with RS232C interface	27



Measuring geometric characteristics is one of the most common tests when carrying out material testing. The most well-known tool is the calliper gauge or the micrometer gauge (micrometer).

In this area of measurement, SAUTER confines itself to integrated calliper gauges which can be used in combination with deformity material testing.

Very often, the issue with material testing relates to a force which is exerted in connection with a specific deformity, i.e. expansion or compression of the test item.

In these cases, the force must be measured or recorded in relation to the distance travelled by the test item during the test.

Integrated calliper gauges capture this distance and these are typically fitted on test stands, machines or plant.

To do this, SAUTER offers two ranges:

- For applications with purely optical reading of the result: LA range
- For applications with digital transfer of the result to a PC: LB range

As a guide, the following has been put together as a sample system for a typical material test stand:

- Length measuring device e.g. LB 200-2
- Test stand, e.g. TVM-N range
- Fitting to test stand e.g. LB-A02
- Calibration e.g. 961-150
- Data transfer software e.g. LB-A01 (only in combination with LB range)

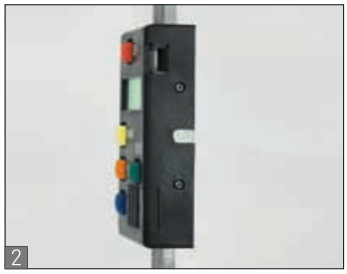
Quick-Finder Length measurement

Readout [d] N	Measuring range [Max] Nm	**Model** **SAUTER**		Page
0,01	200	**LA 200-2**		26
0,01	200	**LB 200-2**		27
0,01	300	**LA 300-2**		26
0,01	300	**LA 300-2H**		26
0,01	300	**LB 300-2**		27
0,01	500	**LB 500-2**		27

Digital length measuring device SAUTER LA

similar to illustration

1


2

Features:

- **Easy to use**
- **Digital sliding calliper with a superior precision** even at high operation speed
- **Easy mounting** to tooling machines, conveyer, test stands, etc.
- 1 Zeroing, pre-added and pre-reduced length as well as switching the unit can be done manually

Technical data:

- Batteries included
- Dimensions housing LxWxH 74x44x18 mm

Distance measurement directly in your machines or installations

STANDARD BATT

STANDARD 1 DAY 2 YEARS GUARANTY

OPTION ISO +4 DAYS

Model SAUTER	Measuring range [Max] mm	Readout [d] mm	Direction of measurement	Length		Option ISO Calibr. Certificate ISO KERN	
LA 200-2	200	0,01	vertical	350		961-150	
LA 300-2	300	0,01	vertical	450		961-150	
LA 300-2H	300	0,01	horizontal	450		961-150	

Digital length measuring device SAUTER LB

Distance measurement directly in your machines or installations with RS 232 C interface

Features

- **Digital sliding calliper with a superior precision** even at high operation speed
- **Easy mounting** to tooling machines, conveyer, test stands, etc.
- Zeroing, pre-added and pre-reduced length as well as switching the unit can be done manually
- **Data interface RS 232 C**, standard
- Selectable measuring units: mm, inch

Technical data

- Dimensions housing WxDxH 77x43x34 mm
- Batteries included

Options

- **Data transfer software** (interface cable included), SAUTER LB-A01
- Mounting the length measuring device onto a SAUTER test bench at the factory, SAUTER LB-A02

STANDARD: BATT, RS 232 | OPTION: SOFTWARE | STANDARD: 1 DAY, 2 YEARS GUARANTY

Model **SAUTER**	Measuring range [Max] mm	Readout [d] mm	Direction of measurement		Option **ISO Calibr. Certificate** ISO KERN	
LB 200-2	200	0,01	vertical		961-150	
LB 300-2	300	0,01	vertical		961-150	
LB 500-2	500	0,01	vertical		961-150	

4 Coating thickness

SAUTER Model		Page
TB	Your reliable worktool for every day: light, easy, precise	29
TC	Your constant companion - compact and easy to use	30
TE	Easy-to-operate, ideal to handle by external sensors	31
TF	Premium measuring device for paint coating, lacquer coating, etc.	32
TG	Premium measuring device with external measuring head for colour coating, lacquer coating, etc.	32

Measuring coating thickness is widely known, for example from the coating thickness measurement used for cars. In fact these measurements are used much more widely in industrial applications. This is where the thickness of the surface finish is measured, such as galvanisation, zinc coating, etc, or also lacquers.

Fundamentally there are two measuring principles for determining coating thickness:

Type F: Non-magnetic coatings on magnetic metals, such as iron or steel (magnetic induction principle). Here are some sample material combinations:

[1)][aluminium, chrome, copper, rubber, lacquer] on

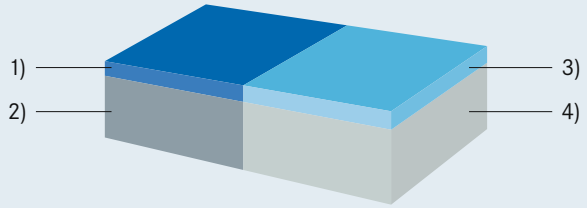
[2)][steel, iron, alloys, magnetic stainless steel]

Type N: Non-magnetic coatings on non-magnetic metals, such as aluminium (eddy current principle). Here are some sample material combinations:

[3)][lacquer, paints, enamel, chrome, plastics] on

[4)][aluminium, brass, sheet metal, copper, zinc, bronze]

Type FN: All coatings as for type F and N on all metals as for type F and N (combination of magnetic induction and eddy current principle)



Quick-Finder Coating thickness

Readout [d] N	Measuring range [Max] µm	Model SAUTER		Page
0,1	1000	**TB 1000-0.1 F**		29
0,1	1000	**TB 1000-0.1 N**		29
0,1	1000	**TB 1000-0.1 FN**		29
0,1	1250	**TC 1250-0.1 F**		30
0,1	1250	**TC 1250-0.1 N**		30
0,1	1250	**TC 1250-0.1 FN**		30
0,1	1250	**TC 1250-0.1 FN-car**		30
0,1	1250	**TE 1250-0.1 F**		31
0,1	1250	**TE 1250-0.1 N**		31
0,1	1250	**TE 1250-0.1 FN**		31
0,1	1250	**TF 1250-0.1 FN**		32
0,1	1250	**TG 1250-0.1 FN**		32
0,1	2000	**TB 2000-0.1 F**		29

Digital coating thickness gauge SAUTER TB

1

2

Your reliable worktool for every day: light, easy, precise

Features

- **External** sensor for difficult-to-access measurements
- **Base plate and calibration foils** included
- 1 Delivered in a hard carrying case
- **Offset-Accur:** This function allows you to adjust the instrument precisely on the locally measured range by a two-point calibration. This results in a superior accuracy of approx. 1 % of the measured value.
- SAUTER TB 2000-0.1F: Specifically designed for the automobile industry
- Selectable measuring units: µm, inch (mil)
- **Auto-Power-Off**

Technical data

- Precision:
  - Standard: 5 % of measured value
  - Offset-Accur: 1 % of measured value
- Minimal measuring area: 6 mm
- Minimal base thickness: 0,3 mm
- Dimensions housing LxWxH 161x69x32 mm
- Battery operation, batteries (4 x 1,5 V AA) standard
- Net weight approx. 0,25 kg

Options

- 2 **Calibration foils** for increased measuring accuracy (covers the range from 20 up to 2000 µm, with < 3% tolerance), SAUTER ATB-US07,

STANDARD: BATT, CAL BLOCK, FOCUS

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] µm	Readout [d] µm	Test object	Smallest sample surface (radius) mm		Option ISO Calibr. Certificate ISO KERN	
TB 1000-0.1F	1000	0,1	Coatings on steel and iron	Convex: 1,5 Concave: 25		961-110	
TB 1000-0.1N	1000	0,1	Insulation coatings on non-magnetic metals	Convex: 3 Concave: 50		961-110	
TB 1000-0.1FN	1000	0,1	Combination instrument: F, N	see F / N		961-112	
TB 2000-0.1F	2000	0,1	Non-magnetic coatings on iron, steel	Convex: 1,5 Concave: 25		961-110	

Digital coating thickness gauge SAUTER TC

04

Your constant companion - compact and easy to use

Features

- Ergonomic design for easy handling
- **Data interface RS 232 C**, included
- **Base plate and calibration foils** included
- 2 Delivered in a hard carrying case
- **Offset-Accur:** This function allows you to adjust the instrument precisely on the locally measured range by a two-point calibration. This results in a superior accuracy of approx. 1 % of the measured value
- Selectable measuring units: µm, inch (mil)

SAUTER TC 1250-0.1FN-CAR:

- Specifically designed for the automobile industry
- **Automatic recognition of measuring mode** (F or N): „point and shoot“
- 1 **Simple and convenient 1-key operation**

Technical data

- Precision:
  - Standard:
  3 % of measured value or ± 2,5 µm
  - Offset-Accur:
  1 % of measured value or ± 1 µm
- Minimal base thickness: 0,3 mm
- Dimensions LxWxH 131x65x28 mm
- Battery operation, batteries standard (4 x 1,5 V AAA)
- Net weight approx. 81 g

Options

- **Software** (interface cable included), SAUTER ATC-01

STANDARD: BATT, CAL BLOCK, FOCUS, RS 232 | OPTION: SOFTWARE | STANDARD: 1 DAY, 2 YEARS GUARANTY | OPTION: ISO +4 DAYS

Model **SAUTER**	Measuring range [Max] µm	Readout [d] µm	Test object	Smallest sample surface (radius) mm		Option **ISO Calibr. Certificate** ISO KERN	
TC 1250-0.1F	100 | 1250	0,1 | 1	Coatings on steel and iron	Convex: 1,5 Concave: 25		961-110	
TC 1250-0.1N	100 | 1250	0,1 | 1	Insulation coatings on non-magnetic metals	Convex: 3 Concave: 50		961-110	
TC 1250-0.1FN	100 | 1250	0,1 | 1	Combination instrument: F / N	see F / N		961-112	
TC 1250-0.1FN-CAR	100 | 1250	0,1 | 1	Combination instrument: F / N	see F / N		961-112	

Digital coating thickness gauge SAUTER TE

1

Easy-to-operate, ideal to handle by external sensors

Features

- **External sensor** for difficult-to-access measurements
- External sensors with other measuring ranges are available on request
- **Data interface RS 232 C**, included
- **Base plate and calibration foils** included
- 1 Delivered in a hard carrying case
- **Offset-Accur:** This function allows you to adjust the instrument precisely on the locally measured range by a two-point calibration. This results in a superior accuracy of approx. 1 % of the measured value
- Selectable measuring units: µm, inch (mil)
- **Auto-Power-Off**

Technical data

- Precision:
  - Standard:
  3 % of measured value or ± 2,5 µm
  - Offset-Accur:
  1 % of measured value or ± 1 µm
- Minimal base thickness: 0,3 mm
- Dimensions LxWxH 131x65x28 mm
- Battery operation, batteries standard (4 x 1,5 V AAA)
- Net weight approx. 81 g

Options

- **Software**, interface cable included, SAUTER ATC-01

STANDARD: BATT, CAL BLOCK, FOCUS, RS 232 | OPTION: SOFTWARE | STANDARD: 1 DAY, 2 YEARS GUARANTY | OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] µm	Readout [d] µm	Test object	Smallest sample surface (radius) mm		Option ISO Calibr. Certificate ISO KERN	
TE 1250-0.1F	100 | 1250	0,1 | 1	Coatings on steel and iron	Convex: 1,5 Concave: 25		961-110	
TE 1250-0.1N	100 | 1250	0,1 | 1	Insulation coatings on non-magnetic metals	Convex: 3 Concave: 50		961-110	
TE 1250-0.1FN	100 | 1250	0,1 | 1	Combination instrument: F / N	see F / N		961-112	

Coating thickness gauges SAUTER TF · TG

SAUTER TF

SAUTER TG

Premium measuring devices for paint coating, lacquer coating, etc.

04

Features

- 1 LCD display, backlit, display of all information at a glance
- **Offset-Accur:** This function allows you to adjust the instrument precisely on the locally measured range by a two-point calibration. This results in a superior accuracy of approx. 1 % of the measured value
- **Scan mode** allows continuous measurement or single point measuring mode
- **Mini Statistics Kit:** displays the measured result, the average value and the max and the min value
- **Internal memory** up to 99 values
- Selectable measuring units: µm, inch (mil)
- **Base plate and calibration foils** included
- **Data interface RS 232 C** standard
- 2 Delivered in a hard carrying case

SAUTER TG:

- **External sensor** for difficult-to-access measurements

Technical data

- Precision:
  - Standard:
  3 % of measured value or ± 2,5 µm
  - Offset-Accur:
  1 % of measured value or ± 1 µm
- Minimal base thickness: 0,3 mm
- Dimensions LxWxH 126x65x35 mm
- Battery operation, batteries standard (2 x 1,5 V AAA)
- Net weight approx. 81 g

Options

- **Software** interface cable included, SAUTER ATC-01

STANDARD: BATT, CAL BLOCK, FOCUS, SCAN, RS 232, STATISTIC, MEMORY

OPTION: SOFTWARE

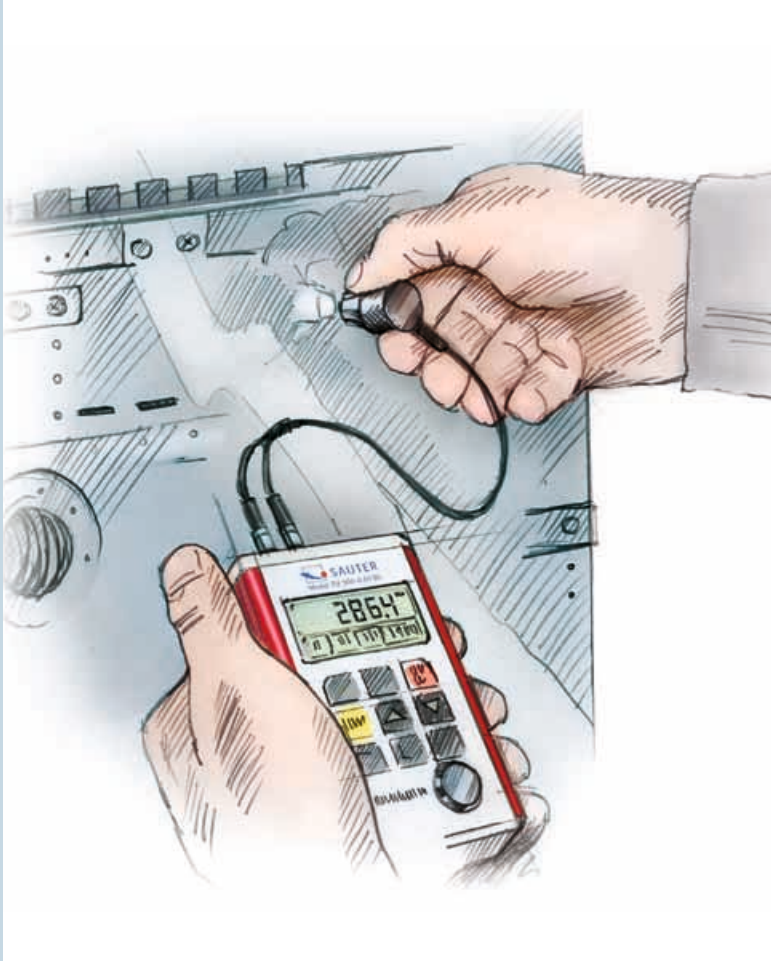
STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] µm	Readout [d] µm	Test object	Smallest sample surface (radius) mm		Option ISO Calibr. Certificate ISO KERN	
TF 1250-0.1FN	100 | 1250	0,1 | 1	Combination instrument: F/N	F: Convex: 1,5 | Concave: 25		961-112	
TG 1250-0.1FN	100 | 1250	0,1 | 1	Combination instrument: F/N	N: Convex: 3 | Concave: 50		961-112	

5 Wall thickness measurement

SAUTER Model		Page
TB-US	Your reliable worktool for every day: light, easy, precise	34
TD-US	Compact thickness gauge with external sensor	35
TN-US	Hand-hold thickness gauge	36
TU-US	Premium ultrasonic thickness gauge	37



In those cases, where the walls of the item to be measured are not accessible for traditional calliper gauges, then ultrasonic measuring equipment can be used.

This measurement is based on the following principle: Ultrasonic waves are directed onto one side of the material to be measured. They move with a defined speed through the material and are reflected on the other side. The measuring device measures the time required to do this and from this, calculates the thickness of the material.

In this way, you can determine the wall thickness of for example ships' hulls, pipes, tanks and components in plants or machines.

Ultrasonic measuring equipment can be used to measure all hard and homogeneous materials, such as metal, glass and hard plastics. This method cannot be used to measure materials such as, for example, concrete, asphalt or wood.

Quick-Finder
Wall thickness measurement

Readout [d] mm	Measuring range [Max] mm	Sensor	Model SAUTER		Page
0,01	80	7 MHz/6 mm	**TN 80-0.01 US**		36
0,01	80	7 MHz/6 mm	**TU 80-0.01 US**		37
0,01	230	5 MHz/10 mm	**TN 230-0.01 US**		36
0,01	230	5 MHz/10 mm	**TU 230-0.01 US**		37
0,01	300	2,5 MHz/14 mm	**TN 300-0.01 US**		36
0,01	300	2,5 MHz/14 mm	**TU 300-0.01 US**		37
0,1	80	7 MHz/6 mm	**TN 80-0.1 US**		35
0,1	200	5 MHz/8 mm	**TB 200-0.1 US-RED**		34
0,1	200	5 MHz/8 mm	**TB 200-0.1 US**		34
0,1	225	5 MHz/8 mm	**TD 225-0.1 US**		35
0,1	230	5 MHz/10 mm	**TN 230-0.1 US**		36
0,1	300	2,5 MHz/14 mm	**TN 300-0.1 US**		36

Ultrasonic thickness gauge SAUTER TB-US

1

Your reliable worktool for every day: light, easy, precise

Features

- **External sensor** for difficult-to-access measurements
- **Base plate for calibration** included
- 1 Delivered in a hard carrying case
- **Auto-Power-Off**
- Selectable measuring units: mm, inch
- TB 200-0.1US-RED can only analyse these materials: cast iron, aluminium, copper, brass, zinc, quartz glass, polyehylene, PVC, grey cast iron, nodular cast iron

Technical data

- Precision: 0,5 % of measured value
- Dimensions LxWxH 161x69x32 mm
- Battery operation, batteries standard (4 x 1,5 V AA)
- Net weight approx. 0,25 kg

Options

- **External sensor**, 5 MHz, Ø 6 mm, for thin test materials: measuring range (steel) 1 - 50 mm, SAUTER ATB-US01
- **External sensor**, 5 MHz, Ø 12 mm, for hot test materials: Measuring range (steel) 1 - 225 mm at normal temperatures, 4 - 100 mm at temperatures of up to 300 °C, SAUTER ATB-US02
- **External sensor**, 7 MHz, Ø 6 mm, for thin test materials: Measuring range 0,75 - 80 mm (steel), SAUTER ATU-US02
- **External sensor**, 5 MHz, Ø 10 mm, SAUTER ATU-US09
- **External sensor**, 5 MHz, Ø 8 mm, SAUTER ATB-US06
- **5 calibration blocks**, steel, 20, 50, 100, 200, 300 mm, SAUTER ATU-09

STANDARD: BATT, CAL BLOCK
STANDARD: 1 DAY, 2 YEARS GUARANTY
OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] mm	Readout [d] mm	Sensor	Sound velocity m/sec		Option ISO Calibr. Certificate ISO KERN	
TB 200-0.1US	1 - 200	0,1	5 Mz / Ø 8 mm	500 - 9000		961-113	
TB 200-0.1US-RED	1 - 200	0,1	5 Mz / Ø 8 mm	–		961-113	

Ultrasonic thickness gauge SAUTER TD-US

1

2

Compact thickness gauge with external sensor

Features

- **External sensor** for difficult-to-access measurements
- **Data interface RS 232 C** included
- **Base plate for calibration** included
- 1 Delivered in a hard carrying case
- Selectable measuring units: mm, inch

Technical data

- Precision: 0,5 % of measured value + 0,1
- Dimensions LxWxH 120x62x30 mm
- Battery operation, batteries standard (4 x 1,5 V AAA), AUTO-OFF function to preserve the batteries
- Net weight approx. 0,164 kg

Options

- **Software**, interface cable included, SAUTER ATD-01
- **External sensor**, 6 MHz, Ø 6 mm, for thin test materials: Measuring range (steel) 1 - 50 mm, SAUTER ATB-US01
- **External sensor**, 5 MHz, Ø 12 mm, for hot test materials: Measuring range (steel) 1 - 225 mm at normal temperatures, 4 - 100 mm at temperatures of up to 300 °C, SAUTER ATB-US02
- **External sensor**, 7 MHz, Ø 6 mm, SAUTER ATU-US02
- **External sensor**, 5 MHz, Ø 10 mm, SAUTER ATU-US09
- **External sensor**, 5 MHz, Ø 10 mm, transducer at an angle of 90°, SAUTER ATU-US10
- 2 **5 calibration blocks**, steel, 20, 50, 100, 200, 300 mm, SAUTER ATU-09

STANDARD: BATT, CAL BLOCK, RS 232 — OPTION: SOFTWARE — STANDARD: 1 DAY, 2 YEARS GUARANTY — OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] mm	Readout [d] mm	Sensor	Sound velocity m/sec		Option ISO Calibr. Certificate ISO KERN	
TD 225-0.1US	1,2 - 225	0,1	5 MHz / Ø 8 mm	500 - 9000		961-113	

Ultrasonic thickness gauge SAUTER TN-US

1

Hand-hold thickness gauge

05

Features

- **External sensor**
- **Data interface RS 232 C**, standard (only for models with readout d = 0,01 mm)
- 1 Delivered in a hard carrying case
- **Scan mode** (10 measurements per sec.) or single point measuring mode possible
- **Internal memory** for up to 20 files (with up to 100 values per file)
- Selectable measuring units: mm, inch

Technical data

- Precision: 0,5 % of measured value ± 0,04 mm
- Dimensions LxWxH 150x74x32 mm
- Battery operation, batteries standard (2 x 1,5 V AA), AUTO-OFF function to preserve the batteries
- Net weight approx. 0,245 kg

Options

- **Software**, interface cable included, SAUTER ATU-04
- **External sensor**, 2,5 MHz, Ø 14 mm, for thick samples, in particular cast iron with rough upper surfaces: Measuring range 3 - 300 mm (steel), SAUTER ATU-US01
- **External sensor**, 7 MHz, Ø 6 mm, for thin test materials: Measuring range 0,75 - 80 mm (steel), SAUTER ATU-US02
- **External sensor**, 5 MHz, Ø 12 mm, for hot test materials: Measuring range (steel) 3 - 200 mm at temperatures of up to 300 °C, SAUTER ATB-US02
- **External sensor**, 5 MHz, Ø 10 mm, SAUTER ATU-US09
- **External sensor**, 5 MHz, Ø 10 mm, transducer at an angle of 90°, SAUTER ATU-US10
- **External sensor**, 6 MHz, Ø 6 mm, for thin test materials: Measuring range (steel) 1 - 50 mm, SAUTER ATB-US01
- **Thermal printer**, SAUTER ATU-05
- **5 calibration blocks**, steel, 20, 50, 100, 200, 300 mm, SAUTER ATU-09

STANDARD: BATT, CAL BLOCK, RS 232, MEMORY — OPTION: SOFTWARE — STANDARD: 1 DAY, 2 YEARS GUARANTY — OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] mm	Readout [d] mm	Sensor	Sound velocity m/sec		Option ISO Calibr. Certificate ISO KERN	
TN 80-0.1US	0,75 - 80	0,1	7 MHz / Ø 6 mm	1000 - 9999		961-113	
TN 230-0.1US	1,2 - 230	0,1	5 MHz / Ø 10 mm	1000 - 9999		961-113	
TN 300-0.1US	3 - 300	0,1	2,5 MHz / Ø 14 mm	1000 - 9999		961-113	
TN 80-0.01US	0,75 - 80	0,01	7 MHz / Ø 6 mm	1000 - 9999		961-113	
TN 230-0.01US	1,2 - 200 | 230	0,01 | 0,1	5 MHz / Ø 10 mm	1000 - 9999		961-113	
TN 300-0.01US	3 - 200 | 300	0,01 | 0,1	2,5 MHz / Ø 14 mm	1000 - 9999		961-113	

Ultrasonic thickness gauge SAUTER TU-US

1

2

3

Premium ultrasonic thickness gauge

Features

- **External sensor** for difficult-to-access measurements
- **Base plate for calibration** included
- 1 **Data interface RS 232 C**
- 2 Delivered in a hard carrying case
- **Scan mode** (10 measurements per sec.) or single point measuring mode possible
- **Internal memory** for up to 20 files (with up to 100 values per file)
- **Function to set limits:** Programmable high / low setpoints for go/no-go testing. Light and sound signal output
- Selectable measuring units: mm, inch

Technical data

- Precision: 0,5 % of measured value ± 0,04 mm
- Dimensions LxWxH 132x76x32 mm
- Battery operation, batteries standard (2 x 1,5 V AA)
- Net weight approx. 0,345 kg

Options

- **Software**, interface cable included, SAUTER ATU-04
- **External sensor**, 2,5 MHz, Ø 14 mm, for thick samples, in particular cast iron with rough upper surfaces: Measuring range 3 - 300 mm (steel), SAUTER ATU-US01
- **External sensor**, 7 MHz, Ø 6 mm, for thin test materials: Measuring range 0,75 - 80 mm (steel), SAUTER ATU-US02
- **External sensor**, 5 MHz, Ø 12 mm, for hot test materials: Measuring range (steel) 3 - 200 mm at temperatures of up to 300 °C, SAUTER ATB-US02
- **External sensor**, 5 MHz, Ø 10 mm, SAUTER ATU-US09
- **External sensor**, 5 MHz, Ø 10 mm, transducer at an angle of 90°, SAUTER ATU-US10
- **External sensor**, 6 MHz, Ø 6 mm, for thin test materials: Measuring range (steel) 1 - 50 mm, SAUTER ATB-US01
- 3 **Thermal printer**, SAUTER ATU-05
- **5 calibration blocks**, steel, 20, 50, 100, 200, 300 mm, SAUTER ATU-09

05

STANDARD: BATT, CAL BLOCK, RS 232, MEMORY — OPTION: SOFTWARE — STANDARD: 1 DAY, 2 YEARS GUARANTY — OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] mm	Readout [d] mm	Sensor	Sound velocity m/sec		Option ISO Calibr. Certificate ISO KERN	
TU 80-0.01US	0,75 - 80	0,01	7 MHz / Ø 6 mm	1000 - 9999		961-113	
TU 230-0.01US	1,2 - 230	0,01	5 MHz / Ø 10 mm	1000 - 9999		961-113	
TU 300-0.01US	3 - 300	0,01	2,5 MHz / Ø 14 mm	1000 - 9999		961-113	

6 Hardness testing of plastics

SAUTER Model		Page
HB	Compact handheld durometer with drag indicator	39
HD	Compact handheld durometer for shore A, C and D	40
TI	Lever operated test stand for hardness testing with base plate made out of glass	41

To determine the hardness of plastics, in 1915 Albert Shore developed an extremely simple process: A pin made of hardened metal and of a defined shape is held by a spring and is then pushed into the test item. Depending on the depth of the penetration, the material tested is either harder or softer. This method has been adopted in the DIN standards 53505 and 7868.

Currently, there are two types of devices used for this test: Mechanical measuring devices with drag indicator and electronic measuring devices.

Mechanical measuring devices (such as the SAUTER HB series) have the advantage that they can be operated with test stands (such as the SAUTER TI series). With a test stand, measurements can be carried out more consistently and accurately.

At this time, KERN does not calibrate Shore hardness testing instruments. As an alternative, we recommend that the measuring device is operated with a calibrated kit of test plates (such as SAUTER AHBA 01).

Quick-Finder
Hardness testing of plastics

Readout [d] Hx	Measuring range [Max] Hx	Type of indenter	**Model** **SAUTER**		Page
1 HA	100 HA	A	**HBA 100-0**		39
1 HC	100 HC	C/0	**HB0 100-0**		39
1 HD	100 HD	D	**HBD 100-0**		39
1 HA	100 HA	A	**HDA 100-1**		40
1 HC	100 HC	C/0	**HD0 100-1**		40
1 HD	100 HD	D	**HDD 100-1**		40

Analogue Shore hardness tester SAUTER HB

1

2

3

Compact handheld durometer with drag indicator

Features

- Typical application: measurement of penetration (Shore)
- Particularly recommended for internal comparison measurement. Standard calibrations e.g. to DIN 53505 are often not possible because of very narrow standard tolerances
- Shore A: rubber, elastomers, neoprene, silicone, vinyl, soft plastics, felt, leather and similar material
- Shore D: plastics, formica, epoxides, plexiglass, etc.
- Shore C/0: foam, sponge, etc.
- **Max mode:** Holds the maximum value in the display
- **Point mode:** Shows one instant value
- Can be attached to the test stands SAUTER TI-AC (for Shore A and 0), TI-D (for Shore D)
- 1 Delivered in a wooden carrying case

Technical data

- Precision: 3 % of [Max]
- Dimensions LxWxH 115x60x25 mm
- Net weight approx. 0,16 kg

Options

Shore comparison plates for testing and calibration of Shore hardness testing devices. By regular comparisons the measuring accuracy increases significantly.

- 2 **7 calibration plates** for Shore A (36, 42, 55, 67, 75, 85, 94 HA), Tolerance up to ± 2 HA, SAUTER AHBA-01
- 3 **3 calibration plates** for Shore D (33, 49, 92 HD), Tolerance up to ± 2 HD, SAUTER AHBD-01
- **Optional ISO calibration of the comparison plates**, KERN 961-170

STANDARD PEAK

STANDARD 1 DAY

2 YEARS GUARANTY

Model SAUTER	Hardness type	Measuring range [Max]	Readout [d]	
HBA 100-0	Shore A	100 HA	1,0 HA	
HB0 100-0	Shore C / 0	100 HC	1,0 HC	
HBD 100-0	Shore D	100 HD	1,0 HD	

Digital Shore Hardness Meter SAUTER HD

1

2

3

Compact handheld durometer for shore A, C and D

Features

- Typical application: measurement of penetration (Shore)
- Shore A: rubber, elastomers, neoprene, silicone, vinyl, soft plastics, felt, leather and similar material
- Shore D: plastics, formica, epoxides, plexiglass, etc.
- Shore C/0: foam, sponge, etc.
- **Max mode:** Holds the maximum value in the display
- **Point mode:** Shows one instant value
- **Average mode:** Calculates the average value out of 9 single measurements
- **Control plate** for calibration included
- **Data interface RS 232 C** included
- 1 Delivered in a hard carrying case

Technical data

- Precision: 1 % of [Max]
- Dimensions LxWxH 162x65x38 mm
- Battery operation, batteries standard (4 x 1,5 V AAA), AUTO-OFF function to preserve the batteries
- Net weight approx. 0,173 kg

Options

- **Software** interface cable included, KERN ATC-01

Shore comparison plates for testing and calibration of Shore hardness testing devices. By regular comparisons the measuring accuracy increases significantly.

- 2 **7 Calibration plates** (36, 42, 55, 67, 75, 85, 94 HA), Tolerance up to ± 2 HA, SAUTER AHBA-01
- 3 **3 Calibration plates** (33, 49, 92 HD), Tolerance up to ± 2 HD, SAUTER AHBD-01
- **Optional ISO calibration of the comparison plates**, KERN 961-170

STANDARD: BATT, PEAK, CAL BLOCK, RS 232 — OPTION: SOFTWARE — STANDARD: 1 DAY, 2 YEARS GUARANTY

Model SAUTER	Hardness type	Measuring range [Max]	Readout [d]	
HDA 100-1	Shore A	100 HA	0,1 HA	
HD0 100-1	Shore C / 0	100 HC	0,1 HC	
HDD 100-1	Shore D	100 HD	0,1 HD	

Manual shore test stand SAUTER TI

Features:

- For Shore hardness testing of plastics, leather etc.
- 1 **Glass plate:** Providing a higher base hardness and superior accuracy
- 2 **Mechanical construction:** Robust design for precise measuring
- 3 **Level adjustment**: For the precise levelling of the base plate blate
- **Adjustable base plate** for the correction of inhomogeneous test objects
- Operation:
  1. The SAUTER hardness testing device HB is fitted in a suspended position
  2. 3. By lowering the handle lever, the measurement instrument is pressed in a controlled manner into the test object
- The accuracy of the displayed result is approx. 25 % higher than in a manual operated test

Technical data:

- Stroke height: 15 mm
- Maximum test object height: 63 mm
- Base plate Ø 75 mm
- Overall dimensions LxWxH 150x110x250 mm
- Net weight approx. 8,5 kg

06

Lever operated test stand for hardness testing with base plate made out of glass

STANDARD FAST-MOVE

STANDARD 1 DAY 2 YEARS GUARANTY

Model SAUTER	Suitable for	
TI-A0	HBA, HB0	
TI-D	HBD	

7 Hardness testing of metals

SAUTER Model		Page
HN-D	Easy and mobile handling, providing precise measurement results	43
HMM	Advanced features for demanding applications	44/45
HMO	Advanced features for professional applications	46/47
HMP	Pure quality for professional users	48/49
HMR	Premium instrument for professional users	50/51

Determining the hardness of metals is of particular significance during the preparation and use of metallic materials. Traditionally, hardness is determined using test machines in accordance with Vickers, Rockwell or Brinell.

Since 1978, a rebound test was used for the first time for mobile measuring, in accordance with Dietmar Leeb. To do this, a standardised impact body (such as, for example SAUTER AHMO D01) is driven against the item to be tested. The rebound of the impact body leads to a deformity of the upper surface, which results in a loss of kinetic energy. This loss of energy is determined by the measuring the speed and this is then used to calculate the Leeb (HL) hardness value.

These measuring devices can be used in any location. Usually they are equipped with a large internal data memory, which allows you to record the measurements at goods inwards or in production.

Our range has compact measuring devices of the so-called „Pen Type“ (HN-D) or measuring devices with external sensors connected by cables.

Quick-Finder
Hardness testing of metals

Readout [d] HL	Sensor	**Model** **SAUTER**		Page
1	D	**HN-D**		43
1	D	**HMM**		44/45
1	D	**HMO**		46/47
1	D	**HMP**		48/49
1	D	**HMR**		50/51

Mobile Leeb hardness tester SAUTER HN-D

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5

„Pen type“ hardness testing device in accordance with Leeb testing for mobile hardness testing of metals

Features

- **User-friendly operation:** The compact version enables the product to be used in a significantly wider range of applications compared with traditional devices
- As the device can be operated using one hand only, the user can operate the device more quickly and use it in a more flexible way
- **Modern LCD display:** Optimised for industrial applications: increased luminosity and backlight can be switched on, so that the display can be read from any angle
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **Internal recoil sensor** included (Type D)
- Selectable measuring units: Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL)
- **Internal data memory** for up to 500 measurements with date and time
- **USB-PC data output:** Easy to install on any PC
- 1 Delivered in a hard carrying case

Technical data

- Accuracy: ± 4 HLD
- Dimensions housing LxWxH 145x35x25 mm
- Operation by rechargeable battery pack, standard
- Mains adapter (internal) standard
- Net weight approx. 0,07 kg

Options

- **PC software to download stored data,** for statistical evaluation, and transfer to MS Excel, SAUTER AHN-01
- 2 **Attachment rings** for secure positioning, SAUTER AHMR 01
- 3 **Impact body** Type D, Net weight approx. 5,5 g, hardness ≥ 1600 HV, tungsten carbide, Impact ball Ø 3 mm, in accordance with the standard ASTM A956-02, SAUTER AHMO D01
- 4 **Test block** Type D / DC, accuracy ≤ 4 HL, Ø 90 mm (± 1 mm), Net weight < 3 kg, hardness range 790 ± 40 HL, SAUTER AHMO D02 630 ± 40 HL, SAUTER AHMO D03 530 ± 40 HL, SAUTER AHMO D04
- **ISO calibration certificate** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132
- 5 **Thermal printer**, wireless infrared connection to SAUTER HN, HMM, HMO, SAUTER AHN-02

STANDARD: ACCU, 230 V, USB, MEMORY, STATISTIC
OPTION: SOFTWARE, PRINT
STANDARD: 1 DAY, 2 YEARS GUARANTY
OPTION: ISO +4 DAYS

Model SAUTER	Sensor	Measuring range [Max] HL	Readout [d] HL		Option ISO Calibr. Certificate ISO KERN	
HN-D	D	0 - 999	1		961-131	

Mobile Leeb hardness tester SAUTER HMM

Advanced features for demanding applications

Mobile Leeb hardness tester SAUTER HMM

Features:

- 1 **Impact (rebound) sensor:** The bounce module is accelerated by a spring against the item being tested. Depending on how hard the object is, the kinetic energy of the module will be absorbed. The speed reduction will be measured and converted to Leeb hardness values.
- **External impact sensor** (Type D) included
- **Automatic recognition of the impact (rebound) sensor** connected to the HMM
- **Mobility:** The SAUTER HMM provides a professional and resilient measurement solution wherever required, i.e. production, product control etc.
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **Data output to PC:** USB output included
- 2 **Wireless IR printer** included for on-site printing of measurement protocols (battery operated)
- 3 **Standard block and support ring** for curved surfaces (Radius > 10 mm)
- **Support rings** for bended testing samples available, on request
- 4 Delivered in a hard carrying case
- **Internal memory** for up to 9 data groups, with up to 9 values per group forming the average value of the group
- **Mini statistics function**: Displays the measure value, the average value, the difference between the maximum and minimum values, date and time
- **Measurement value display**: Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion**: The measuring result is automatically converted into all specified hardness units

Technical data:

- Precision: 1 % at 800 HLD (± 6 HLD)
- Measuring range tensile strength: 375 - 2639 MPa (steel)
- Min. sample weight on a solid and stable support:
  Sensor D + DC: 3 kg
  Sensor G: 15 kg
- Min. sample thickness:
  Sensor D + DC: 8 mm
  Sensor G: 10 mm
- Min. sample radius (concave/convex): 50 mm
  (with support ring: 10 mm)
- Dimensions LxWxH 150x80x30 mm
- Mains adapter external standard
- Optional battery operation, batteries standard (3 x 1,5 V AAA), AUTO-OFF function to preserve the batteries, battery level indicator
- Net weight approx. 0,2 kg

Options:

- 5 **External impact sensor** Type DC. Short impact sensor for tests in holes or hollowed objects, SAUTER AHMO DC

Measuring range hardness: HL with D Sensor (HLD): Min: 170 to Max: 960 HLD			
Material		Applied sensor D / DC	
		Min	Max
Steel and cast iron	**HRC**	19,8	68,5
	HRB	59,6	99,6
	HSD	26,4	99,5
	HB	440,0	651,0
	HV	83,0	976,0
Tool steel (coldwork steel)	**HRC**	19,8	68,5
	HV	83,0	976,0
Stainless steel	**HRB**	59,6	99,6
	HRC	19,8	68,5
	HB	140,0	651,0
	HV	83,0	976,0
Cast iron	**HB**	140,0	334,0
Nodular cast iron	**HB**	140,0	387,0
Cast aluminium alloys	**HB**	30,0	159,0
Brass (copper-zinc alloys)	**HB**	40,0	173,0
	HRB	13,5	95,3
Bronze (copper-aluminium-tin alloys)	**HB**	60,0	290,0
Wrought copper alloys	**HB**	45,0	315,0

STANDARD

STANDARD

OPTION

Model	Readout	Sensor		Option **ISO Calibr. Certificate**	
SAUTER	[d] HL			ISO KERN	
HMM	1	D		961-131	

Mobile Leeb hardness tester SAUTER HMO

Advanced features for professional applications

3

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Mobile Leeb hardness tester SAUTER HMO

Features:

- **Innovative touchscreen**
- **Automatic recognition of the impact (rebound) sensor** connected to the HMO
- **Mobility:** The SAUTER HMO provides a professional and resilient measurement solution wherever required, i.e. production, product control etc.
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- 1 **Data output to PC:** USB output included
- 2 **Wireless IR printer** included for on-site printing of measurement protocols (battery operated)
- 3 **Standard block and support ring** for curved surfaces (Radius > 10 mm)
- **Support rings** for bended testing samples available, on request
- 4 Delivered in a hard carrying case
- **Internal memory** for up to 800 data groups, with up to 99 values per group forming the average value of the group
- **Mini statistics function**: Displays the measure value, the average value, the difference between the maximum and minimum values, date and time
- **Measurement value display**: Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion**: The measuring result is automatically converted into all specified hardness units

Technical data:

- Precision: 1 % 800 HLD (± 6 HLD)
- Measuring range tensile strength: 375 - 2639 MPa (steel)
- Min. sample weight on a solid and stable support:
  Sensor D + DC: 3 kg
  Sensor G: 15 kg
- Min. sample thickness:
  Sensor D + DC: 8 mm
  Sensor G: 10 mm
- Min. sample radius (concave/convex): 50 mm
  (with support ring: 10 mm)
- Dimensions LxWxH 135x83x24 mm
- Operation by rechargeable battery pack, operating time approx. 50 h, mains adapter included, AUTO-OFF function to preserve the batteries, charge indicator
- Net weight approx. 0,228 kg

Options:

- 5 **External impact sensor** Type DC. Short impact sensor for tests in holes or hollowed objects, SAUTER AHMO DC
- 5 **External impact sensor** Type G. High energy sensor: 900% impact energy compared to type D, SAUTER AHMO G

Measuring range hardness: HL with D Sensor (HLD): Min: 170 to Max: 960 HLD					
Material		Applied sensor			
		D/DC		G	
		Min	Max	Min	Max
Steel and cast iron	**HRC**	19,8	68,5	–	–
	HRB	59,6	99,6	47,7	99,9
	HSD	26,4	99,5	–	–
	HB	440,0	651,0	90,0	646,0
	HV	83,0	976,0	–	–
Tool steel (cold work steel)	**HRC**	19,8	68,5	–	–
	HV	83,0	976,0	–	–
Stainless steel	**HRB**	59,6	99,6	–	–
	HRC	19,8	68,5	–	–
	HB	140,0	651,0	–	–
	HV	83,0	976,0	–	–
Cast iron	**HB**	140,0	334,0	92,0	326,0
Nodular cast iron	**HB**	140,0	387,0	32,0	168,0
Cast aluminium alloys	**HB**	30,0	159,0	–	–
Brass (copper-zinc alloys)	**HB**	40,0	173,0	–	–
	HRB	13,5	95,3	–	–
Bronze (copper-aluminium-tin alloys)	**HB**	60,0	290,0	–	–
Wrought copper alloys	**HB**	45,0	315,0	–	–

STANDARD: ACCU, 230 V, CAL BLOCK, PRINT, USB, STATISTIC, TOL

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model	Readout	Sensor		Option **ISO Calibr. Certificate**	
SAUTER	[d] HL			ISO KERN	
HMO	1	D		961-131	

Mobile Leeb hardness tester SAUTER HMP

Pure quality for professional users

- Min. sample weight on a solid and stable support:
  Sensor C: 1,5 kg
  Sensor D, DC, D+15, DL: 5 kg
  Sensor G: 15 kg
- Min. sample thickness:
  Sensor C: 1 mm
  Sensor D, DC, D+15, DL: 8 mm
  Sensor G: 10 mm

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Mobile Leeb hardness tester SAUTER HMP

Features:

- **Automatic recognition of the impact (rebound) sensor** connected to the HMP
- Measures all metal samples (> 5 kg, thickness > 8 mm)
- **Mobility:** The SAUTER HMP provides a professional and resilient measurement solution wherever required, i.e. production, product control etc.
- 1 **External impact sensor** standard (Type D)
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- Software and PC connection cable standard
- **Standard block for calibration** with defnied HLD value standard
- **Support rings** for bended testing samples available, on request
- 2 Delivered in a hard carrying case
- **Internal memory** for up to 100 data groups, with up to 32 values per group forming the average value of the group
- **Mini statistics function:** displays the measured result, the average value, the impact direction, date and time
- **Measurement value display**: Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion**: The measuring result is automatically converted into all specified hardness units

Technical data:

- Precision: ± 1 % at 800 HLD
- Measuring range tensile strength: 374 - 2652 MPa (steel)
- Min. sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Dimensions LxWxH 150x74x32 mm
- Battery operation, batteries standard (2 x 1,5 V AA), operating time approx. 100 h, AUTO-OFF function to preserve the batteries, battery level indicator
- Net weight approx. 0,245 kg

Options:

- 3 **External impact sensor** Type DC. Short impact sensor for tests in holes or hollowed objects, SAUTER AHMR DC
- 4 **External impact sensor** Type DL, for very narrow surfaces (Ø 4,5 mm), SAUTER AHMR DL
- 5 **External impact sensor** Type C. Low energy sensor: 25% impact energy compared to type D, for testing tiny or light objects or the surface of hardened layer, SAUTER AHMR C
- 5 **External impact sensor** Type D+15. Slim front section for holes, grooves or re-entrant surfaces, SAUTER AHMR D+15
- 5 **External impact sensor** Type G. High energy sensor: 900% impact energy compared to type D, SAUTER AHMR G
- **Thermal printer**, SAUTER ATU-05

Measuring range hardness: HL with D Sensor (HLD): Min: 170 to Max: 960 HLD													
Material		Applied sensor											
		D/DC		D+15		C		G		E		DL	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Steel and cast iron	**HRC**	20,0	68,5	19,3	67,9	20,0	69,5			22,4	70,7	20,6	68,2
	HRB	38,4	99,6	–	–	–	–	47,7	99,9	–	–	37,0	99,9
	HRA	59,1	85,8	–	–	–	–	–	–	61,7	88,0	–	–
	HB	127,0	651,0	80,0	638,0	80,0	683,0	90,0	646,0	83,0	663,0	81,0	646,0
	HV	83,0	976,0	80,0	937,0	80,0	996,0	–	–	84,0	1042,0	80,0	950,0
	HS	32,2	99,5	33,3	99,3	31,8	102,1	–	–	35,8	102,6	30,6	96,8
Tool steel (cold work steel)	**HRC**	20,4	67,1	19,8	68,2	10,7	68,2	–	–	22,6	70,2	–	–
	HV	80,0	898,0	80,0	935,0	100,0	941,0	–	–	82,0	1009,0	–	–
Stainless steel	**HRB**	46,5	101,7	–	–	–	–	–	–	–	–	–	–
	HB	85,0	655,0	–	–	–	–	–	–	–	–	–	–
	HV	85	802,0	–	–	–	–	–	–	–	–	–	–
Grey cast iron	**HRC**	93,0	334,0	–	–	–	–	92,0	326,0	–	–	–	–
	HB												
	HV												
Nodular cast iron	**HRC**	131,0	387,0	–	–	–	–	127,0	364,0	–	–	–	–
	HB												
	HV												
Cast aluminium alloys	**HB**	19,0	164,0	–	–	23,0	210,0	32,0	168,0	–	–	–	–
	HRB	23,8	84,6	–	–	22,7	85,0	23,8	85,5	–	–	–	–
Brass (copper-zinc alloys)	**HB**	40,0	173,0	–	–	–	–	–	–	–	–	–	–
	HRB	13,5	95,3	–	–	–	–	–	–	–	–	–	–
Bronze (copper-aluminium-tin alloys)	**HB**	60,0	290,0	–	–	–	–	–	–	–	–	–	–
Wrought copper alloys	**HB**	45,0	315,0	–	–	–	–	–	–	–	–	–	–

STANDARD: BATT, CAL BLOCK, RS 232, SOFTWARE, STATISTIC

OPTION: PRINT

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model	Readout	Sensor		Option **ISO Calibr. Certificate**	
SAUTER	[d] HL			ISO KERN	
HMP	1	D		961-131	

Mobile Leeb hardness tester SAUTER HMR

Premium instrument for professional users

- Min. sample weight on a solid and stable support:
  Sensor C: 1,5 kg
  Sensor D...: 5 kg
  Sensor G: 15 kg
- Min. sample thickness:
  Sensor C: 1 mm
  Sensor D...: 8 mm
  Sensor G: 10 mm

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Mobile Leeb hardness tester SAUTER HMR

Features:

- **Automatic recognition of the impact (rebound) sensor** connected to the HMR
- **Mobility:** The SAUTER HMR provides a professional and resilient measurement solution wherever required, i.e. production, product control etc.
- Measures all metal samples (> 5 kg, thickness > 8 mm)
- **External impact sensor** standard (Type D)
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- Software and PC connection cable standard
- **Standard block for calibration** with defnied HLD value standard
- **Support rings** for bended testing samples available, on request
- **Robust metal housing**
- 2 Delivered in a hard carrying case
- **Internal memory** for up to 100 data groups, with up to 33 values per group forming the average value of the group
- **Function to set limits:** Programmable high / low setpoints for go/no-go testing. Light and sound signal output
- **Mini statistics function:** displays the measured result, the average value, the impact direction, date and time
- **Measurement value display**: Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion**: The measuring result is automatically converted into all specified hardness units

Technical data:

- Precision: ± 1 % at 800 HLD
- Measuring range tensile strength: 374 - 2652 MPa (steel)
- Min. sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Dimensions LxWxH 132x76x32 mm
- Battery operation, batteries standard (2 x 1,5 V AA), operating time approx. 50 h, AUTO-OFF function to preserve the batteries, battery level indicator
- Net weight approx. 0,345 kg

Options:

- 3 **External impact sensor** Type DC. Short impact sensor for tests in holes or hollowed objects, SAUTER AHMR DC
- 4 **External impact sensor** Type DL, for very narrow surfaces (Ø 4,5 mm), SAUTER AHMR DL
- 5 **External impact sensor** Type C. Low energy sensor: 25% impact energy compared to type D, for testing tiny or light objects or the surface of hardened layer, SAUTER AHMR C
- 5 **External impact sensor** Type D+15. Slim front section for holes, grooves or re-entrant surfaces, SAUTER AHMR D+15
- 5 **External impact sensor** Type G. High energy sensor: 900% impact energy compared to type D, SAUTER AHMR G

Measuring ranges hardness: HL with D Sensor (HLD): Min: 170 to Max: 960 HLD													
Material		Applied sensor											
		D/DC		D+15		C		G		E		DL	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Steel and cast iron	**HRC**	20,0	68,5	19,3	67,9	20,0	69,5			22,4	70,7	20,6	68,2
	HRB	38,4	99,6	–	–	–	–	47,7	99,9	–	–	37,0	99,9
	HRA	59,1	85,8	–	–	–	–	–	–	61,7	88,0	–	–
	HB	127,0	651,0	80,0	638,0	80,0	683,0	90,0	646,0	83,0	663,0	81,0	646,0
	HV	83,0	976,0	80,0	937,0	80,0	996,0	–	–	84,0	1042,0	80,0	950,0
	HS	32,2	99,5	33,3	99,3	31,8	102,1	–	–	35,8	102,6	30,6	96,8
Tool steel (cold work teel)	**HRC**	20,4	67,1	19,8	68,2	10,7	68,2	–	–	22,6	70,2	–	–
	HV	80,0	898,0	80,0	935,0	100,0	941,0	–	–	82,0	1009,0	–	–
Stainless steel	**HRB**	46,5	101,7	–	–	–	–	–	–	–	–	–	–
	HB	85,0	655,0	–	–	–	–	–	–	–	–	–	–
	HV	85	802,0	–	–	–	–	–	–	–	–	–	–
Grey cast iron	**HRC**	93,0	334,0	–	–	–	–	92,0	326,0	–	–	–	–
	HB												
	HV												
Nodular cast iron	**HRC**	131,0	387,0	–	–	–	–	127,0	364,0	–	–	–	–
	HB												
	HV												
Cast aluminium alloys	**HB**	19,0	164,0	–	–	23,0	210,0	32,0	168,0	–	–	–	–
	HRB	23,8	84,6	–	–	22,7	85,0	23,8	85,5	–	–	–	–
Brass (copper-zinc alloys)	**HB**	40,0	173,0	–	–	–	–	–	–	–	–	–	–
	HRB	13,5	95,3	–	–	–	–	–	–	–	–	–	–
Bronze (copper-aluminium-tin alloys)	**HB**	60,0	290,0	–	–	–	–	–	–	–	–	–	–
Wrought copper alloys	**HB**	45,0	315,0	–	–	–	–	–	–	–	–	–	–

STANDARD: BATT, CAL BLOCK, USB, TOL, SOFTWARE, STATISTIC

STANDARD: 1 DAY; 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model	Readout	Sensor		Option **ISO Calibr. Certificate**	
SAUTER	[d] HL			ISO KERN	
HMR	1	D		961-131	

8 Occupational safety/ Environment

SAUTER Model		Page
SN	Light measuring instrument for precise light measurement up to 100,000 Lux	53
SO	Light measuring instrument for precise light measurement up to 200,000 Lux	54
SU	Professional sound level meter for measuring noise, class II	55
SX	Temperature measurement for occupational safety	56

The prevention of accidents as well as modern health care have, got the same operational starting point in many countries. With industrialisation and the development of cities, regular preventive medical examinations were introduced for wide sections of the population.

Up to now, occupational health and safety in the sense of accident prevention has - essentially - become a real part of operational responsibility.

Therefore, SAUTER has a complete package of general measuring equipment available. This can be used to measure environmental influences such as in particular, noise (acoustic pressure), light, force (physical loading) and temperature.

Furthermore we can offer you a practical carry case, to safely transport all devices. (MPS-A09).

For regular calibration you can use our pick-up and return service, which will save you a lot of effort and expenses.

Quick-Finder
Occupational safety/Environment

Readout [d]	Measuring range [Max]	Model SAUTER		Page
0,1|1|10|100 lux	100|1.000|10.000|100.000 lux	**SN 100K**		53
0,1|1|10|100 lux	200|2.000|20.000|200.000 lux	**SO 200K**		54
0,1°C | 0,1 % RH	50°C | 5-98 % RH	**SX 50C**		55
0,1 db	30-130 db	**SU 130**		56

Light measuring instrument SAUTER SN

1

Light measuring instrument for precise light measurement up to 100,000 Lux

Features

- Measures illumination in the workplace
- Helps to determine whether a workstation has insufficient light or whether there is too much light
- Photo sensor: Silicone diode
- **Sturdy protective cover** for the photo sensor
- 1 Delivery in a robust soft box
- **TRACK function** for continuous recording of variable environmental conditions
- **HOLD function** to fix the current measured values
- Selectable measuring units: lx, fc (foot-candle)

Technical data

- Measuring frequency: 5 Hz
- Cable length (Photo sensor) approx. 1 m
- Dimensions WxDxH 130x70x30 mm
- Battery operation, battery not standard (1 x 9 V)
- Net weight approx. 0,17 kg

STANDARD: PEAK, BATT

STANDARD: 1 DAY, 2 YEARS GUARANTY

OPTION: ISO +4 DAYS

Model SAUTER	Measuring range [Max] lx	Readout [d] lx		Option **ISO Calibr. Certificate** ISO KERN	
SN 100K	100	0,1		961-190	
	1.000	1			
	10.000	10			
	100.000	100			

08

Light measuring instrument SAUTER SO

1

Light measuring instrument for precise light measurement up to 200,000 Lux

Features

- Measures illumination in the workplace
- Helps to determine whether a workstation has insufficient light or whether there is too much light
- Photo sensor: Silicone diode
- **Cosine correction** for light which falls at an angle
- **Sturdy protective cover** for the photo sensor
- **Increased service life**: Impact protection through a protective casing
- 1 Delivery in a robust box
- **TRACK function** for continuous recording of variable environmental conditions
- **HOLD function** to fix the current measured values
- **Real time** or **Peak Hold Mode** to observe transcients or capture peaks
- Selectable measuring units: fc (foot-candle), lx

Technical data

- Measuring frequency: 5 Hz
- Cable length (Photo sensor) approx. 1 m
- Dimensions WxDxH 148x70x40 mm
- Battery operation, battery not standard (1 x 9 V)
- Net weight approx. 0,25 kg

STANDARD: PEAK, BATT
STANDARD: 1 DAY, 2 YEARS GUARANTY
OPTION: ISO +4 DAYS

08

Model SAUTER	Measuring range [Max] lx	Readout [d] lx		Option **ISO Calibr. Certificate** ISO KERN	
SO 200K	200	0,1		961-190	
	2.000	1			
	20.000	10			
	200.000	100			

Thermo-hygrometer SAUTER SX

1

Bi-sensor instrument for professional applications

Features

- Universal instrument to cater for a variety of applications
- **Silmutanous measurement of**
  - Temperature
  - Humidity
  thanks to the remote Bi-Sensor (included)
- **Measurements inside machines and devices** is possible using the cable sensor (included)
  - Temperature
- High-contrast LCD display: Optimised for all industrial applications: Also suitable for use in dark working conditions
- Measures the temperature and the air humidity in the workplace
- Allows you to determine whether the working conditions are too cold or too warm, or whether the humidity is within an acceptable range
- 1 **Sturdy transport case**
- **TRACK function** for continuous recording of variable environmental conditions
- **HOLD function** to fix the current measured values
- By pressing the **MAX key** the display can be "frozen"
- By pressing the **MIN key** the display can be "frozen"
- Selectable measuring units: °C, °F (Temperature); %RH (Humidity)

Technical data

- Measuring frequency: 2,5/sec
- Cable length (Bi-Sensor) approx. 1.5 m
- Cable length (Cable sensor) approx. 0.9 m
- Overall dimensions WxDxH 180x110x25 mm
- Optional battery operation, battery not standard
  (1 x 9 V), AUTO-OFF function to preserve the battery
- Net weight approx. 0,17 kg

STANDARD: BATT, PEAK
STANDARD: 1 DAY, 2 YEARS GUARANTY
OPTION: ISO +4 DAYS

Model SAUTER	Sensor	Type	Measuring range [Max]	Readout [d]		Option ISO Calibr. Certificate ISO KERN	
SX 50C	Bi	Temperature	-10 - 50 °C	0,1 °C		961-210	
		Humidity	5 - 98 %RH	0,1 %RH			
	Wire	Temperature	-20 - 1000 °C	1 °C			

08

Sound level meter SAUTER SU

1

2

Professional sound level meter, Class II

Features

- **Professional sound level meter** for measuring noise in areas such as, for example, the environment, mechanical applications, car industry, and much more
- Measures the sound intensity in the workplace
- Helps in differentiating between normal noise influences and excessive noise, e.g. in a production hall
- 1 **Data interface RS 232 C**, included
- 2 Delivered in a hard carrying case
- **Multi measuring functions:**
  Lp: Standard sound level measuring function
  Leq: Energy equivalent sound level measuring mode (type A)
  Ln: Shows the deviation from a pre-defined limit in %
- Selectable methods of evaluation:
  A: As sensitive as the human ear
  C: Sensitive for noisier environmental conditions, where there are machines, plant, motors, etc.
  F: For areas where sound intensity does not vary
- **Function to set limits:** Programmable target value for go / no-go test values.
- **TRACK function** for continuous recording of variable environmental conditions
- **Real time** or **Peak Hold Mode** to observe transcients or capture peaks
- **Internal memory** for measured values, for 30 measurements. Can be displayed on the PC

Technical data

- Dimensions WxDxH 236x63x26 mm
- Battery operation, batteries not standard (4 x 1,5 V AAA)
- Net weight approx. 0,17 kg

Options

- **Data transfer software**, interface cable included, SAUTER ATC-01
- **Adjustment device** for regular adjustment of the sound level meter, SAUTER ASU-01

STANDARD: PEAK, BATT, TOL, RS 232, MEMORY
OPTION: SOFTWARE
STANDARD: 1 DAY, 2 YEARS GUARANTY
OPTION: ISO +4 DAYS

08

Model SAUTER	Type	Measuring range dB	Readout dB		Option ISO Calibr. Certificate ISO KERN	
SU 130	Lp A	30 - 130	0,1		961-200	
	Lp C	35 - 130				
	Lp F	35 - 130				

SAUTER Special equipment

FH-L | High capacity force-measurement system

- Force-measurement system for measuring high-capacity tension and compression forces from 200 kN up to 1000 kN
- Typical applications are in the ship-building industry or in the construction of machinery and plant
- 1 The force-measurement system is delivered as standard with a round measuring cell and can be extended to included tension and compression sensors, as an option, see illustration 2, not included

For more information, please visit www.kern-sohn.com/en/FH-L

FK-T | Measuring device for the tensile strength of cables, threads, wires, etc.

- Tensile force measuring for testing material tension characteristics of e.g. cables, wires, threads, twine etc.
- These tensile tests are generally carried out as part of the process control of machines, conveyor systems as well as in textile production

For more information, please visit www.kern-sohn.com/en/FK-Tensio

NEW

TPE | Manual test stand for peel and extraction testing

- Specially developed test stand for peel and extraction testing. As part of such test sequences, a bonded material layer is usually pulled away from a base material. With this test bench, a constant vertical as well as horizontal movement can be carried out
- When used with force-measuring devices from the SAUTER FH range, this test stand gives you a universal solution up to a tensile force of 500 N (Force-measuring device is not included with the delivery)

For more information, please visit www.kern-sohn.com/en/TPE

NEW

TVM-Special Box | Motorised test bench for large numbers of test items

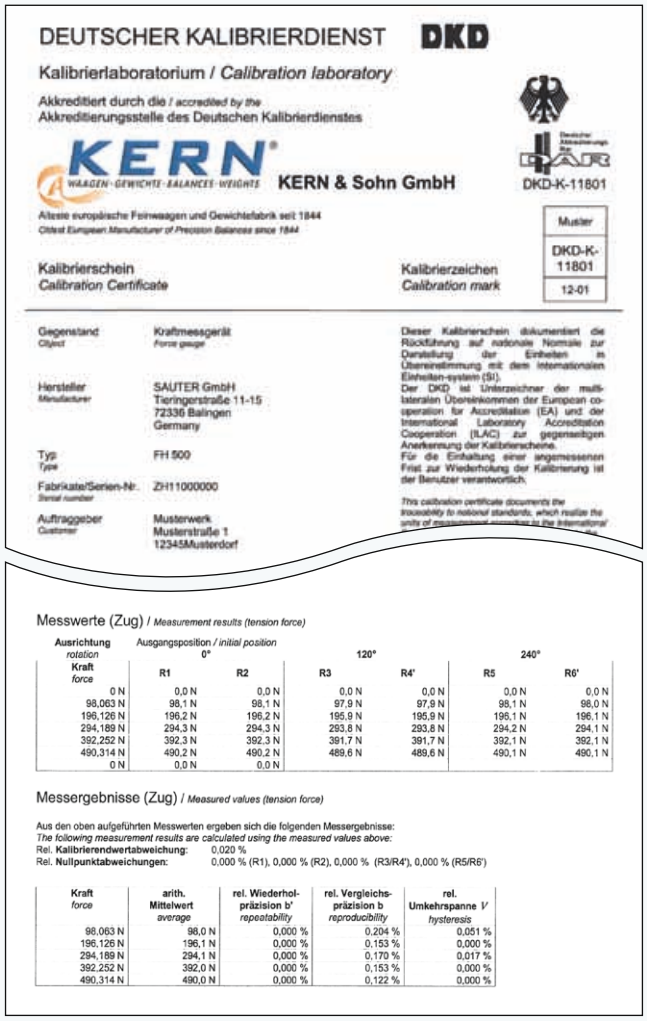
- Universal test stand to generate mechanical movement with an exceptional working width of around half a metre
- When used with force-measuring devices from the SAUTER FH range and the optional SAUTER AC 50 support, this test bench is particularly suitable for carrying out quality tests on parcels, cardboard boxes or packaging of any type

For more information, please visit www.kern-sohn.com/en/TVM-Special-Box

08

Test service for measuring instruments

DKD calibration certificate for balances (extract)
Further details on the internet www.kern-lab.com



DEUTSCHER KALIBRIERDIENST DKD

Kalibrierlaboratorium / *Calibration laboratory*

Akkreditiert durch die / *accredited by the*
Akkreditierungsstelle des Deutschen Kalibrierdienstes

KERN WAAGEN · GEWICHTE · BALANCES · WEIGHTS KERN & Sohn GmbH

DKD-K-11801

Älteste europäische Feinwaagen und Gewichtefabrik seit 1844
Oldest European Manufacturer of Precision Balances since 1844

Muster
DKD-K-11801
12-01

Kalibrierschein
Calibration Certificate

Kalibrierzeichen
Calibration mark

Gegenstand *Object*	Kraftmessgerät *Force gauge*
Hersteller *Manufacturer*	SAUTER GmbH Tieringerstraße 11-15 72336 Balingen Germany
Typ *Type*	FH 500
Fabrikate/Serien-Nr. *Serial number*	ZH11000000
Auftraggeber *Customer*	Musterwerk Musterstraße 1 12345Musterdorf

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem internationalen Einheiten-system (SI).
Der DKD ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International

Messwerte (Zug) / *Measurement results (tension force)*

Ausrichtung *rotation*	Ausgangsposition / *initial position* 0°		120°		240°	
Kraft *force*	R1	R2	R3	R4'	R5	R6'
0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N
98,063 N	98,1 N	98,1 N	97,9 N	97,9 N	98,1 N	98,0 N
196,126 N	196,2 N	196,2 N	195,9 N	195,9 N	196,1 N	196,1 N
294,189 N	294,3 N	294,3 N	293,8 N	293,8 N	294,2 N	294,1 N
392,252 N	392,3 N	392,3 N	391,7 N	391,7 N	392,1 N	392,1 N
490,314 N	490,2 N	490,2 N	489,6 N	489,6 N	490,1 N	490,1 N
0 N	0,0 N	0,0 N				

Messergebnisse (Zug) / *Measured values (tension force)*

Aus den oben aufgeführten Messwerten ergeben sich die folgenden Messergebnisse:
The following measurement results are calculated using the measured values above:
Rel. **Kalibrierendwertabweichung**: 0,020 %
Rel. **Nullpunktabweichungen**: 0,000 % (R1), 0,000 % (R2), 0,000 % (R3/R4'), 0,000 % (R5/R6')

Kraft *force*	arith. Mittelwert *average*	rel. Wiederhol-präzision b' *repeatability*	rel. Vergleichs-präzision b *reproducibility*	rel. Umkehrspanne *v hysteresis*
98,063 N	98,0 N	0,000 %	0,204 %	0,051 %
196,126 N	196,1 N	0,000 %	0,153 %	0,000 %
294,189 N	294,1 N	0,000 %	0,170 %	0,017 %
392,252 N	392,0 N	0,000 %	0,153 %	0,000 %
490,314 N	490,0 N	0,000 %	0,122 %	0,000 %

The advantages of using KERN in-house calibration

- **Quick calibration:** duration four working days only
- **Competence:** Laboratory meets the highest metrological standards (for mass)
- **Keeping recalibration calendar** for your individual instrument
- **Universal use:** Calibration possible for variety of instruments shown in catalogue

Recalibration

- **Typical industrial recalibration times** may be recommended as follows:
  - daily use (once or several times): Recalibration times: 12 months
  - weekly use (or less frequent use): Recalibration times: 24 months
- **Recalibration prices**: The prices for initial calibration and recalibration are identical (see the table shown here). Costs for cleaning or for the production of special holders to carry out the calibration will be calculated separately, if required

Price Calibration

Number New	Number Old	Indicator	Measuring range	
963-161	CF 500 DKD 1	Force (DKD)	500 N (for tension)	
961-161	CF 500	Force (ISO)	0 – 500 N	
961-162	CF 2k	Force (ISO)	0 – 2000 N	
961-163	CF 10k	Force (ISO)	0 – 10 000 N	
961-164	CF 20k	Force (ISO)	0 – 20 000 N	
961-165	CF 50k on request	Force (ISO)	0 – 50 000 N	
961-166	CF 100k on request	Force (ISO)	0 – 100 000 N	
961-167		Force of MAP	0 – 130 kg	
961-110	CT 2000	Coating thick-ness (ISO)	0 - 2000 µm F or N	
961-112	CT 2000d	Coating thick-ness (ISO)	0 - 2000 µm FN	
961-113	CT 500m	Wall thickness ultra sound (ISO)	0 – 300 mm in stainless steel	
961-114	ATU-08	Wall thickness for test blocks	0 – 300 mm	
961-170	CH Block	Hardness Shore (ISO)	For sets up to 7 plates	
961-131	CH 1kL	Hardness Leeb (ISO)	400 – 800 HLD	
961-132	ATU-08	Hardness Leeb (ISO)	Test block for Leeb-durometer	
961-150	CL 500	Length (ISO)	0 – 300 mm	
961-120	CD 500 on request	Torque (ISO)	0 – 500 Nm	
961-190	-	Light (ISO)	0 – 200 000 Lux	
961-200	-	Sound level (ISO)	0 – 150 dBA	
961-210	-	Temperature (ISO)	- 18 to + 60 °C	